Installation instructions

DHP-A
DHP-A Opti
DHP-AL
DHP-AL Opti
DHP-C
DHP-H
DHP-H Opti Pro
DHP-L
DHP-L Opti

VMBMA702

If these instructions are not followed during installation and service, Danfoss A/Sliability according to the applicable warranty is not binding. Danfoss A/S retains the right to make changes to components and specifications without prior notice.

The Swedish language is used for the original instructions. Other languages are a translation of original instructions.
(Directive 2006/42/EG)

Contents

1 About the instructions

1.1 Introduction

The installation instructions start by describing heat pump data. The installation instructions later give instructions in a logical order covering unpacking, installation procedure, and checking the installation.

References to chapters and sections within the instructions are in italics, e.g.: *About the instructions*.

References to menu options in the heat pump's control system are in upper case, e.g.: INFORMATION ->OPERAT. -> AUTO.

All figures in the instructions are numbered to help installers and service technicians refer to them easily.

1.2 Symbols

The instructions contain different warning symbols, which, together with text, indicate to the user that there are risks involved with actions to be taken.

The symbols are displayed to the left of the text and three different symbols are used to indicate the degree of danger:

DANGER! Hazardous electrical voltage!Indicates an immediate danger that leads to fatal or serious injury if necessary measures are not taken.

Warning! Risk of personal injury!Indicates a possible danger that can lead to fatal or serious injury if necessary measures are not taken.

Caution! Risk of installation damage. Indicates a possible hazard that can lead to item damage if necessary measures are not taken.

A fourth symbol is used to give practical information or tips on how to perform a procedure.

Note! Information regarding making the handling of the installation easier or a possible operational technical disadvantage.

1.3 Terminology

The instructions contain terms throughout that designate components and functions. The table lists the most common terms that are used in the instructions.

Table 1. Terminology

Term	Meaning
Heating system	The circuit that generates heat to the property or to the water heater.
Supply line	The heating system's supply line with flow direction from the heat pump to radiators/ under floor heating or water heater.
Return line	The heating system's return line with flow direction from radiators/under floor heating or water heater to the heat pump.
Circulation pump	Circulation pump for heating system.
Refrigerant circuit	The energy carrying circuit between the outdoor air and heating system.
Refrigerant	The gas/liquid that circulates in the refrigerant circuit.

2 Important information/Safety regulations

Warning! Risk of personal injury! Children are not permitted to play with the apparatus.

Warning! As the water temperature in DHP-H Opti Pro becomes extremely hot, a mixer valve must be installed between the cold water and hot water pipes to ensure a lower domestic hot water temperature.

Warning! Danfoss SP (1-phase) heat pumps have a factory installed safety valve for temperature and pressure, (10 bar 90-95° C), in accordance with the requirements in Great Britain. This valve is located in the water tank and may not be used for any purpose other than connecting the outlet pipe.
Also note that for heat pump DHP-H Opti Pro SP it is imperative that the hot water temperature is changed from default setting 95° C to 85° C.

Caution! The heat pump must be installed by authorised installation engineers and the installation must follow the applicable local rules and regulations as well as these installation instructions.

Caution! This apparatus is not intended for persons (including children) with reduced physical, sensory or psychological capacity, or who do not have knowledge or experience, unless supervised or they have received instructions on how the apparatus functions from a safety qualified person.

Caution! The heat pump must be located in a frost-free environment!

Caution! The heat pump must be placed in an area with a floor drain.

Caution! The heat pump must be located on a stable base. The floor must be able to support the gross weight of the heat pump with filled hot water tank (see Technical data).

Caution! To prevent leaks, ensure that there are no stresses in the connecting pipes!

Caution! It is important that the heating system is bled after installation.

Caution! Bleed valves must be installed where necessary.

Caution! The hot water tank must be equipped with an approved safety valve.

Caution! Heating systems with closed expansion tanks must also be supplied with approved pressure gauges and safety valves.

Caution! Cold and hot water pipes and overflow pipes from safety valves must be made of heat resistant and corrosion-resistant material, e.g. copper. The safety valve overflow pipes must have an open connection to the drain and visibly flow into this in a frost-free environment.

Caution! The connecting pipe between the expansion tank and the safety valve must slope continuously upwards. A continuous upwards slope means that the pipe must not slope downwards from the horizontal at any point.

Note! If there is any risk of groundwater infiltration at wall lead-ins for brine pipes, watertight grommets must be used.

Note! In addition to applicable local rules and regulations the installation should be carried out in a manner that prevents vibrations from the heat pump being transmitted into the house causing noise.

2.1 Refrigerant

Caution! Work on the refrigerant circuit must only be carried out by a certified engineer!

Although the heat pump cooling system (refrigerant circuit) is filled with a chlorine-free and environmentally-approved refrigerant that will not affect the ozone layer, work on this system may only be carried out by authorized persons.

2.1.1 Fire risk

The refrigerant is not combustible or explosive in normal conditions.

2.1.2 Toxicity

In normal use and normal conditions the refrigerant has low toxicity. However, although the toxicity of the refrigerant is low, it can cause injury (or be highly dangerous) in abnormal circumstances or where deliberately abused.

Warning! Risk of personal injury! Spaces in which heavy vapour can collect below the level of the air must be well ventilated.

Refrigerant vapour is heavier than air and, in enclosed spaces below the level of a door for example, and in the event of leakage, concentrations can arise with a resultant risk of suffocation due to a lack of oxygen.

Warning! Risk of personal injury! Refrigerant exposed to a naked flame creates a poisonous irritating gas. This gas can be detected by its odour even at concentrations below its permitted levels. Evacuate the area until it has been sufficiently ventilated.

2.1.3 Work on the refrigerant circuit

Caution! When repairing the refrigerant circuit, the refrigerant must not be released from the heat pump, it must treated in the appropriate way.

Draining and refilling must only be carried out using new refrigerant (for the amount and type of refrigerant see manufacturer's plate) through the service valves.

Caution! All warranties from Thermia Värme ABDanfoss A/S are void if, when filling with refrigerant other than Thermia Värme ABDanfoss A/S specified refrigerant, if there has not been written notification that the new refrigerant is an approved replacement refrigerant together with other remedies.

2.1.4 Scrapping

Caution! When the heat pump is to be scrapped the refrigerant must be extracted for disposal. Local rules and regulations related to the disposal of refrigerant must be followed.

2.2 Electrical connection

Caution! Electrical installation may only be carried out by an authorized electrician and must follow applicable local and national regulations.

Caution! The electrical installation must be carried out using permanently routed cables. It must be possible to isolate the power supply using an all-pole circuit breaker with a minimum contact gap of 3 mm. (The maximum load for externally connected units is 2A).

DANGER! Hazardous electrical voltage! The terminal blocks are live and can be highly dangerous due to the risk of electric shock. All power supplies must be isolated before electrical installation is started. The heat pump is connected internally at the factory, for this reason electrical installation consists mainly of the connection of the power supply.

Note! The room sensor is connected to a safety extra-low voltage.

Follow the separate installation instructions for the room sensor!

2.3 Commissioning

Caution! The installation may only be commissioned if the heating system and brine system have been filled and bled. Otherwise the circulation pumps can be damaged.

Caution! If the installation is only to be driven by an auxiliary heater during the installation, ensure that the heating system is filled and the brine pump and compressor cannot be started. This is carried out by setting the operating mode to AUX. HEATER.

3 Check and safety functions

The heat pump has a number of check and safety functions to protect the installation against damage during abnormal operating conditions.

The diagram below shows the heat pump's three circuits with respective safety functions.

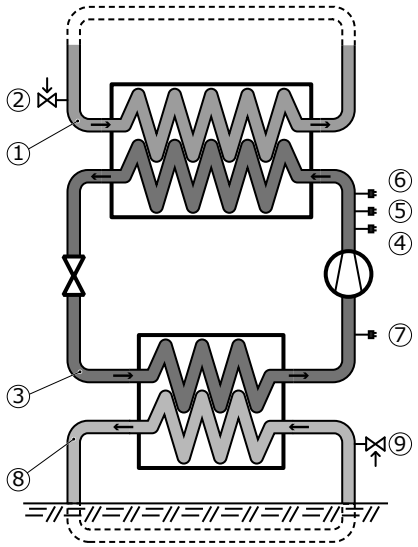


Figure 1. Check and safety functions

Symbol explanation

1	Heat transfer fluid circuit
2	Safety valve, heat transfer fluid circuit, externally mounted
3	Refrigerant circuit
4	Operating pressure switch, normal
5	Operating pressure switch, alternative
6	High pressure switch
7	Low pressure switch
8	Brine circuit
9	Safety valve, brine fluid circuit, externally mounted

Heat transfer fluid circuit (1)

If the pressure in this circuit exceeds the opening pressure for the safety valve (2), the valve opens, releases the overpressure and closes again. The safety valve overflow pipe must have an open connection to the drain and visibly flow into this in a frost-free environment.

Refrigerant circuit (3)

The refrigerant circuit's high pressure side is equipped with a high pressure switch (6) and two operating pressure switches (4, 5), only one of which is connected. The connected operating pressure switch stops the compressor when the working pressure is reached, which is when sufficient heat energy has been produced.

If the operating pressure switch does not work and the pressure continues to increase in the circuit, the high pressure switch activates when its break pressure is reached, whereupon the compressor stops and the heat pump's normal operation is blocked.

If the high pressure switch is activated an alarm indicator flashes on the heat pump's control panel and a warning text appears in the display of the control panel. The blocked heat pump is reset by setting the operating mode to OFF and then back to the previously selected mode (AUTO/HEAT PUMP/ADD. HEATER/HOT WATER).

The low pressure switch (7) stops the compressor and blocks the heat pump's operation if the pressure becomes too low in the cooling circuit's low pressure side.

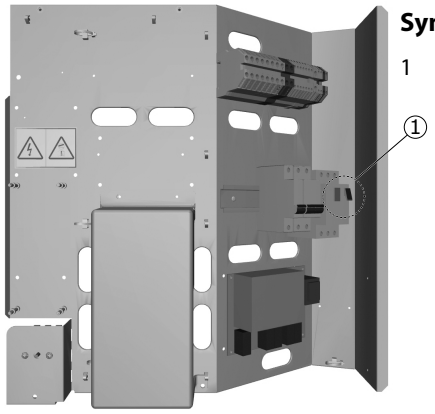
If the low pressure switch is activated, the heat pump's normal operation is blocked, an alarm indicator on the heat pump's control panel flashes and a warning text appears in the display of the control panel. The blocked heat pump is reset by setting the operating mode to OFF and then back to the previously selected mode (AUTO/HEAT PUMP/ADD. HEATER/HOT WATER).

Brine circuit (8)

If the pressure in this circuit exceeds the opening pressure for the safety valve (9), the valve opens, releases the overpressure and closes again. The safety valve overflow pipe must have an open connection to the drain and visibly flow into this in a frost-free environment.

Compressor

The compressor is equipped with a thermal over current relay to protect it against over current.



Symbol explanation

1 Thermal over current relay (F11)

Figure 2. The thermal over current relay on the electrical panel

If the thermal over current relay (1) is activated, the heat pump's normal operation is blocked, an alarm indicator on the heat pump's control panel flashes and a warning text appears in the display of the control panel.

The blocked heat pump is reset by setting the operating mode to OFF and then back to the previously selected mode (AUTO/HEAT PUMP/ADD. HEATER/HOT WATER).

The compressor is also equipped with an internal protector that stops the compressor if it risks becoming overheated. The internal protector cannot be reset manually, the compressor must cool before it can be restarted. No alarm connected to this protector.

Circulation pumps

The circulation pumps have internal overload protectors, which are reset automatically after cooling.

The overload protectors in circulation pumps for 10 - 16 kW heat pumps (8 - 12 kW air/water heat pumps) also activate the alarm for motor protection and block the heat pump's normal operation. Indication and resetting occur in the same way as for the compressor.

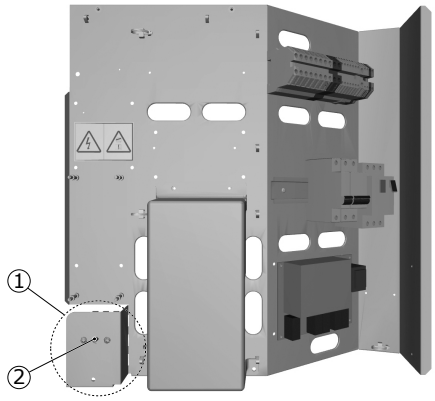
Alarm mode

If an alarm that affects the heat pump's normal operation is activated this will be indicated in the display window. In order to further attract attention, the heat pump will not produce hot water.

The heat pump will initially meet the heat demand using the compressor. If this is not possible, the built-in electric heating element engages.

Auxiliary heater, electric heating element

The auxiliary heater consists of an electric heating element mounted on the heating system supply line. It has an overheat protector that switches off the electric heating element if it is at risk of becoming overheated. The overheat protector's control unit is on the electrical panel.



Symbol explanation

1	Overheating protection
2	Reset button

Figure 3. The overheat protector on the electrical panel

If the overheat protector is activated an alarm indicator flashes on the heat pump's control panel and a warning text appears.

The overheat protector is reset by pushing the reset button (2).

Caution! The overheat protector must only be reset by authorised personnel.

Technical data

See technical data at the end of this document for detailed technical specifications.

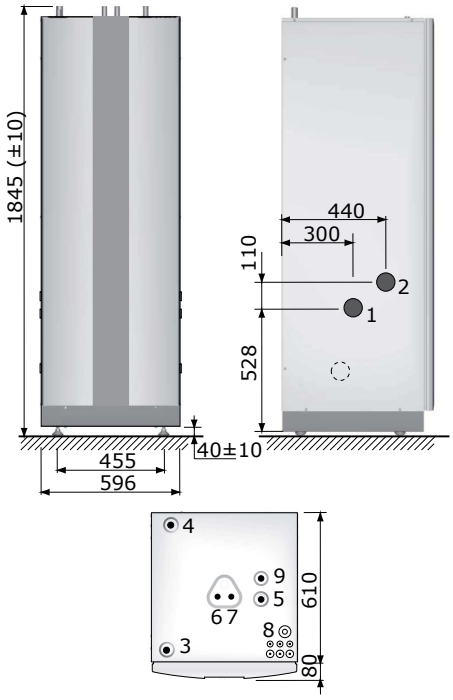
4 Heat pump information

Note! Illustrations of products are not precise drawings and must only be considered as schematic images. Differences in component parts may occur.

4.1 DHP-H

4.1.1 Dimensions and connections

The brine pipes can be connected on either the left or right-hand sides of the heat pump.



Symbol explanation

1	Brine in, 28 Cu
2	Brine out, 28 Cu
3	Heating system supply pipe, 22 Cu: 4-10 kW, 28 Cu: 12-16 kW
4	Heating system return pipe, 22 Cu: 4-10 kW, 28 Cu: 12-16 kW
5	Expansion pipe, 22 Cu
6	Hot water line, 22 mm
7	Cold water line, 22 mm
8	Lead-in for supply, sensor and communication cables
9	Safety valve for temperature and pressure (only applies to certain models)

Figure 4. Dimensions and connections

4.1.2 Components

The component image below shows a schematic of what the inside of a heat pump looks like. There may be differences between different versions.

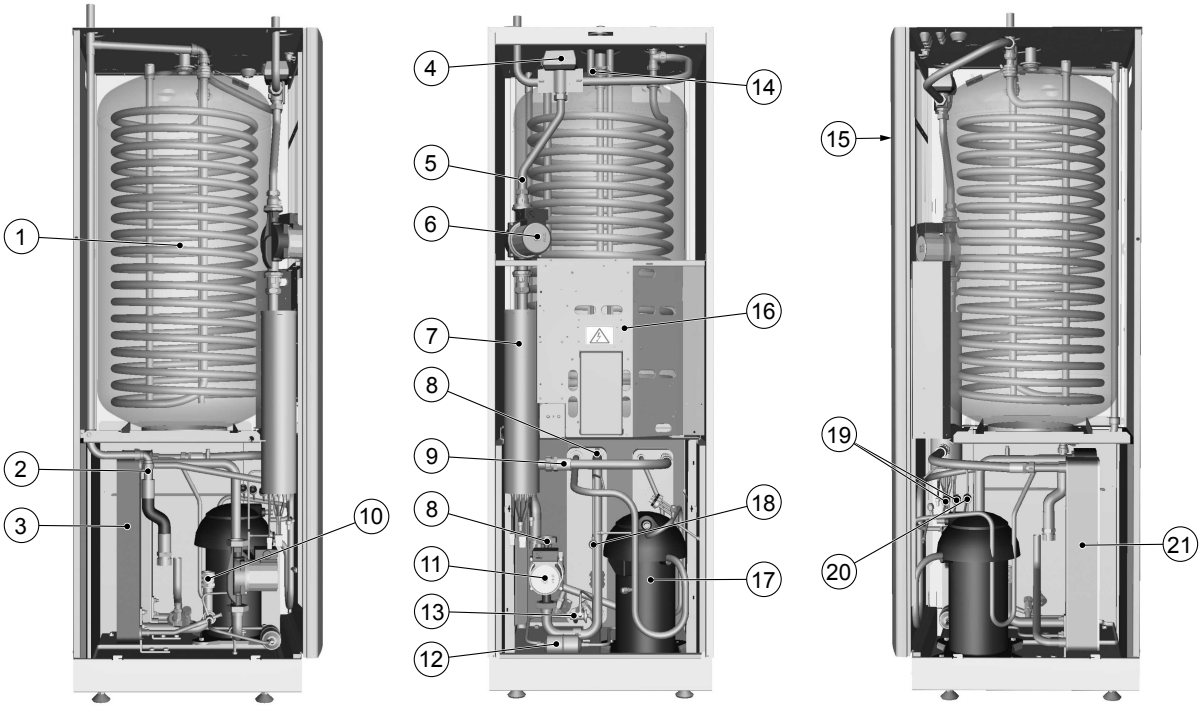


Figure 5. The components are shown above

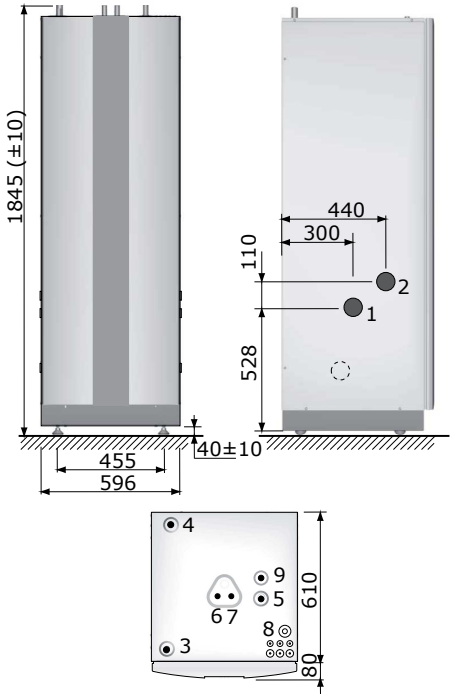
Symbol explanation

1	Water heater, 180 litres	12	Drying filter
2	Return pipe sensor, heating system	13	Expansion valve
3	Evaporator, insulated	14	Hot water temperature sensor (displays maximum temperature)
4	Reversing valve	15	Control panel for control equipment
5	Supply line sensor	16	Electrical panel
6	Heating system circulation pump	17	Compressor
7	Auxiliary heating, immersion heater	18	Low pressure switch
8	Brine in	19	Operating pressure switches
9	Heating system supply line	20	High pressure switch
10	Brine out	21	Condenser with primary side drain
11	Brine pump brine system		

4.2 DHP-H Opti Pro

4.2.1 Dimensions and connections

The brine pipes can be connected on either the left or right-hand sides of the heat pump.



Symbol explanation

1	Brine in, 28 Cu
2	Brine out, 28 Cu
3	Heating system supply pipe, 22 Cu: 4-10 kW, 28 Cu: 12-16 kW
4	Heating system return pipe, 22 Cu: 4-10 kW, 28 Cu: 12-16 kW
5	Expansion pipe, 22 Cu
6	Hot water line, 22 mm
7	Cold water line, 22 mm
8	Lead-in for supply, sensor and communication cables
9	Safety valve for temperature and pressure (only applies to certain models)

Figure 6. Dimensions and connections

4.2.2 Components

The component image below shows a schematic of what the inside of a heat pump looks like. There may be differences between different versions.

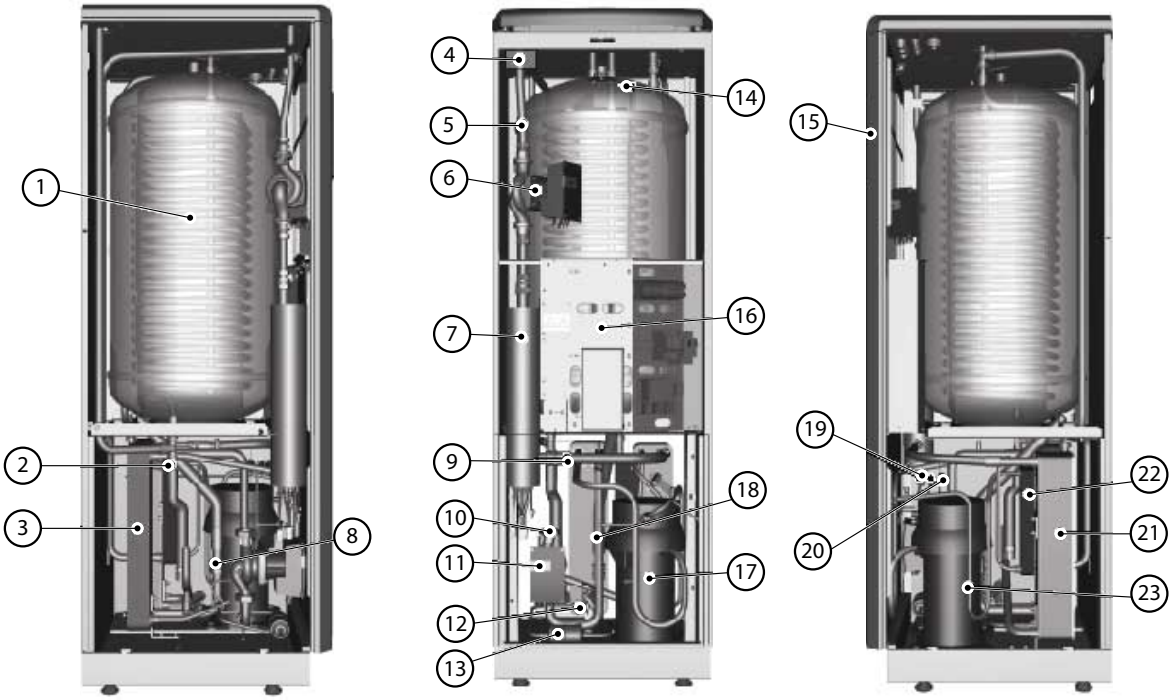


Figure 7. Components

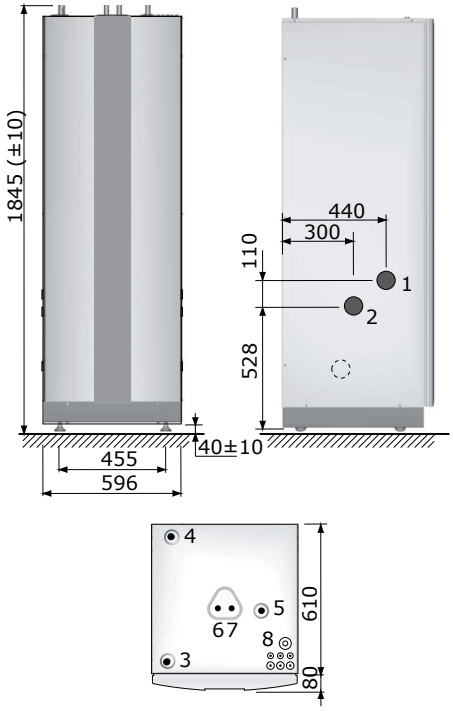
Symbol explanation

1	Water heater, 180 litres	13	Drying filter
2	Return pipe sensor, heating system	14	Hot water temperature sensor (displays maximum temperature)
3	Evaporator, insulated	15	Control panel for control equipment
4	HGW shunt valve	16	Electrical panel
5	Supply pipe sensor, heating system	17	Compressor
6	Heating system circulation pump	18	Low pressure switch
7	Auxiliary heating, immersion heater	19	Operating pressure switches
8	Brine out	20	High pressure switch
9	Heating system supply line	21	Condenser with primary side drain
10	Brine in	22	De-superheater
11	Brine pump brine system	23	HGW sensor
12	Expansion valve		

4.3 DHP-C

4.3.1 Dimensions and connections

The brine pipes can be connected on either the left or right-hand sides of the heat pump.



Symbol explanation

1	Brine in, 28 Cu
2	Brine out, 28 Cu
3	Heating system supply pipe, 22 Cu
4	Heating system return pipe, 22 Cu
5	Expansion pipe, 22 Cu
6	Hot water line, 22 mm
7	Cold water line, 22 mm
8	Lead-in for supply, sensor and communication cables

Figure 8. Dimensions and connections

4.3.2 Components

The component image below shows a schematic of what the inside of a heat pump looks like. There may be differences between different versions.

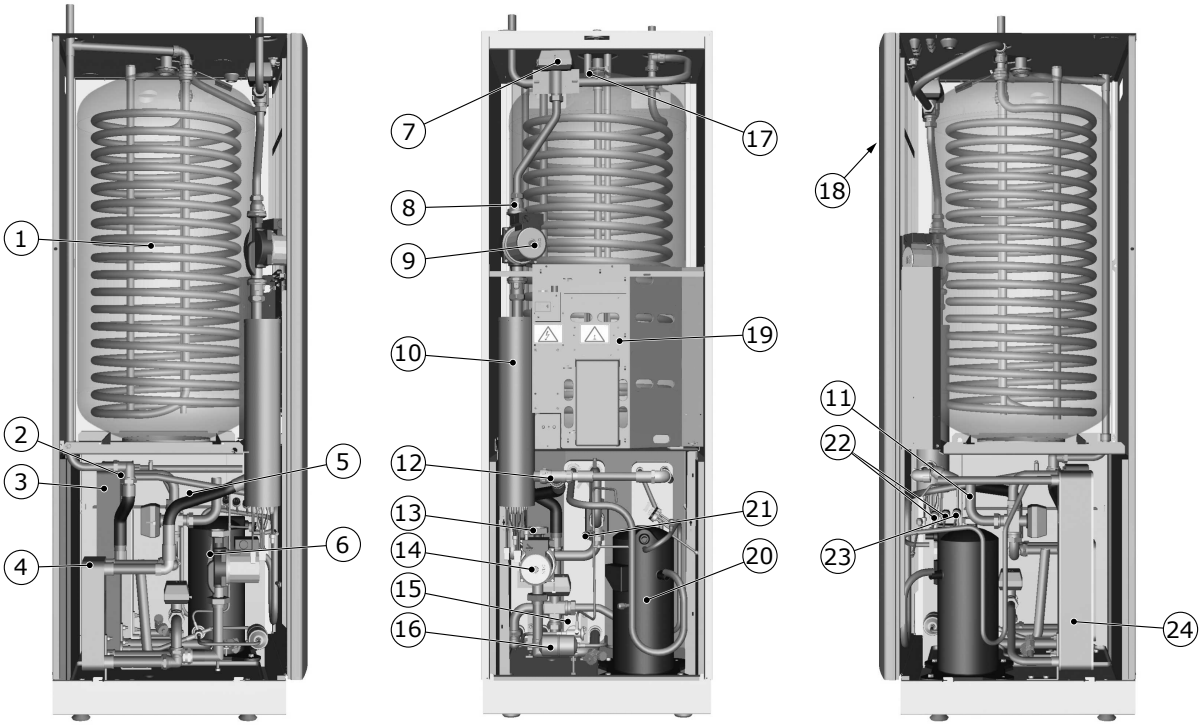


Figure 9. The components are shown above

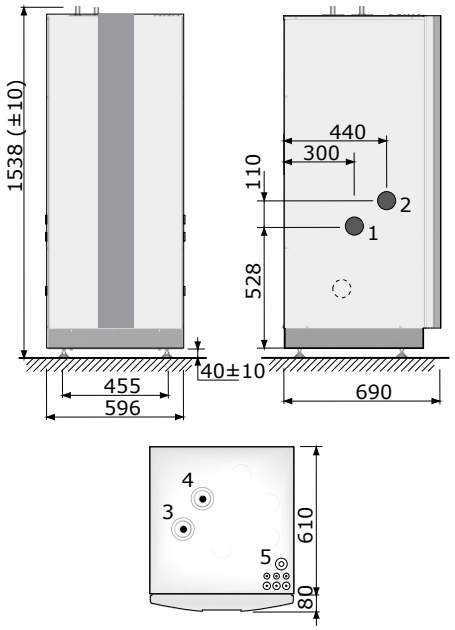
Symbol explanation

1	Water heater, 180 litres
2	Return pipe sensor, heating system
3	Evaporator, insulated
4	Heat exchanger for cooling operation
5	Exchange valve cooling
6	Shunt cooling
7	Exchange valve, heating/hot water
8	Supply line sensor
9	Heating system circulation pump
10	Auxiliary heating, immersion heater
11	Brine in
12	Heating system supply line
13	Brine out
14	Brine pump, brine system
15	Expansion valve
16	Drying filter
17	Hot water temperature sensor (displays maximum temperature)
18	Control panel for control equipment
19	Electrical panel
20	Compressor
21	Low pressure switch
22	Operating pressure switch
23	High pressure switch
24	Condenser with primary side drain

4.4 DHP-L, DHP-L Opti

4.4.1 Dimensions and connections

The brine pipes can be connected on either the left or right-hand sides of the heat pump.



Symbol explanation

1	Brine in, 28 Cu
2	Brine out, 28 Cu
3	Heating system supply pipe, 22 Cu: 4-10 kW, 28 Cu: 12-16 kW
4	Heating system return pipe, 22 Cu: 4-10 kW, 28 Cu: 12-16 kW
5	Lead-in for supply, sensor and communication cables

4.4.2 Components

The component image below shows a schematic of what the inside of a heat pump looks like. There may be differences between different versions.

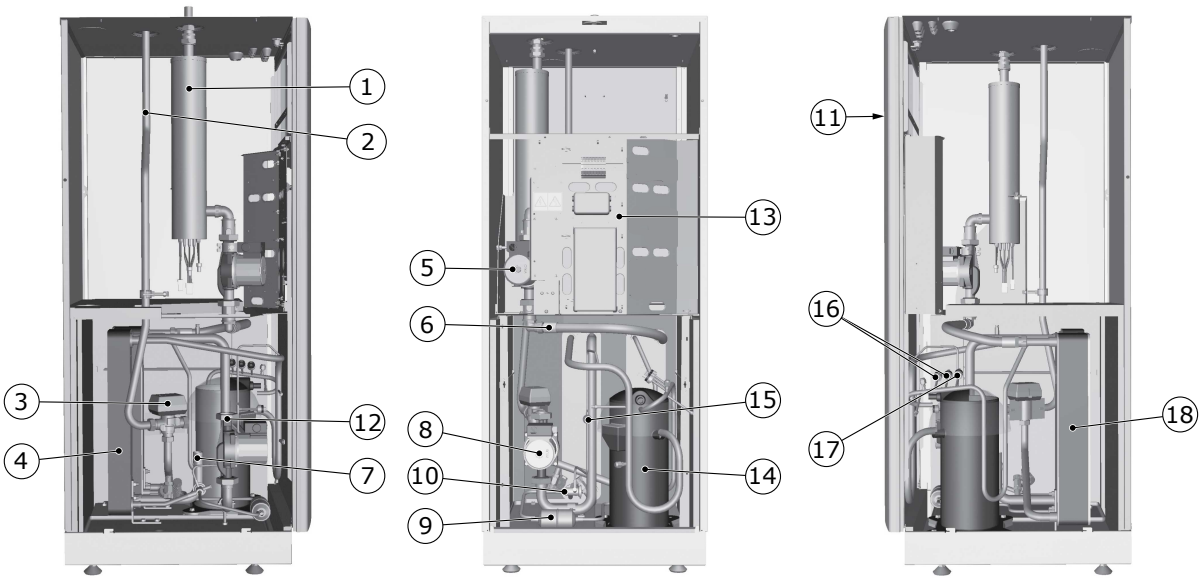


Figure 10. The components are shown above

Symbol explanation

1	Auxiliary heater, immersion heater on supply line	10	Expansion valve
2	Return pipe, heating system	11	Control panel for control equipment
3	Reversing valve	12	Brine in
4	Evaporator, insulated	13	Electrical panel
5	Heating system circulation pump	14	Compressor
6	Supply pipe sensor, heating system	15	Low pressure switch
7	Brine out	16	Operating pressure switches

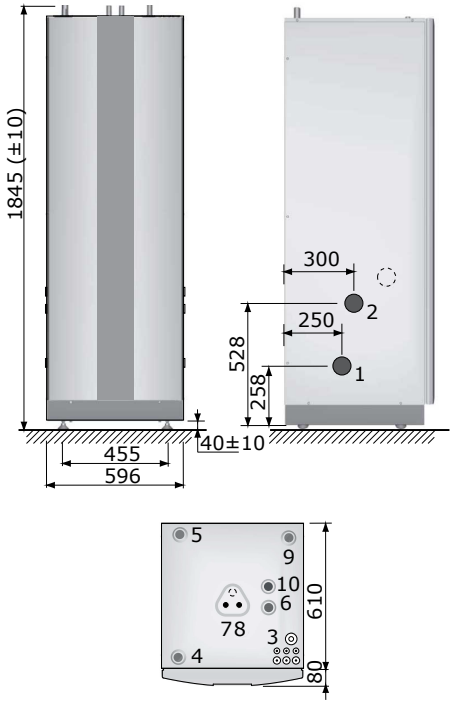
Symbol explanation

8	Brine pump brine system	17	High pressure switch
9	Drying filter	18	Condenser with primary side drain

4.5 DHP-A, DHP-A Opti

4.5.1 Dimensions and connections

The brine pipes can be connected on either the left or right-hand sides of the heat pump.



Symbol explanation

1	Brine in, 28 Cu
2	Brine out, 28 Cu
3	Lead-in for supply, sensor and communication cables
4	Heating system supply pipe, 22 Cu: 6-10 kW, 28 Cu: 12 kW
5	Heating system return pipe, 22 Cu: 6-10 kW, 28 Cu: 12 kW
6	Expansion pipe, 22 Cu
7	Hot water line, 22 mm
8	Cold water line, 22 mm
9	Expansion outlet brine circuit, R25 int.
10	Safety valve for temperature and pressure (only applies to certain models)

Figure 11. Dimensions and connections

4.5.2 Outdoor unit

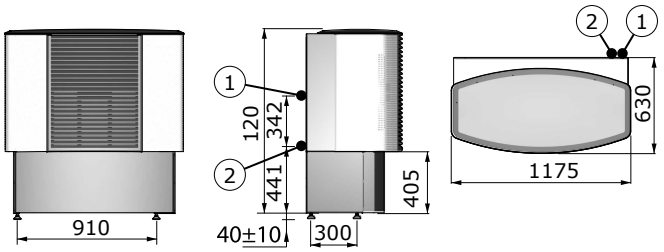


Figure 12. Outdoor unit, dimensions and connections.

Symbol explanation

1	Brine in, 28 Cu
2	Brine out, 28 Cu

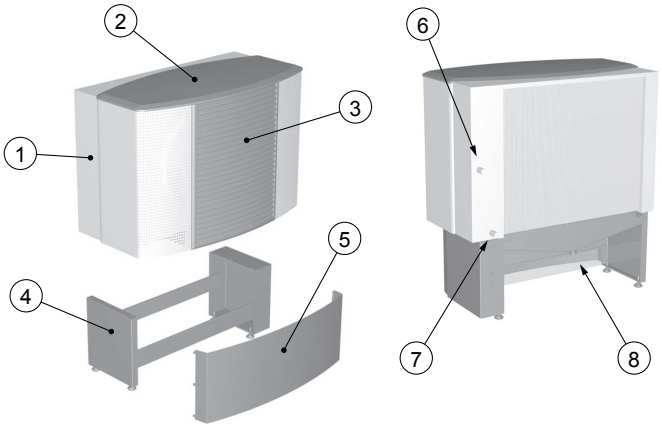


Figure 13. Outdoor unit and connections

Symbol explanation

1	Outdoor unit	5	Cover
2	Cover	6	Connection, brine in to outdoor unit
3	Front cover	7	Connection, brine out from outdoor unit
4	Stand	8	Connection, drain drip tray

Check that the delivery of the outdoor unit contains the following:

- Outdoor unit
- Disassembled stand
- Necessary screws, nuts and washers.
- Defrost sensor

4.5.3 Components

The component image below shows a schematic of what the inside of a heat pump looks like. There may be differences between different versions.

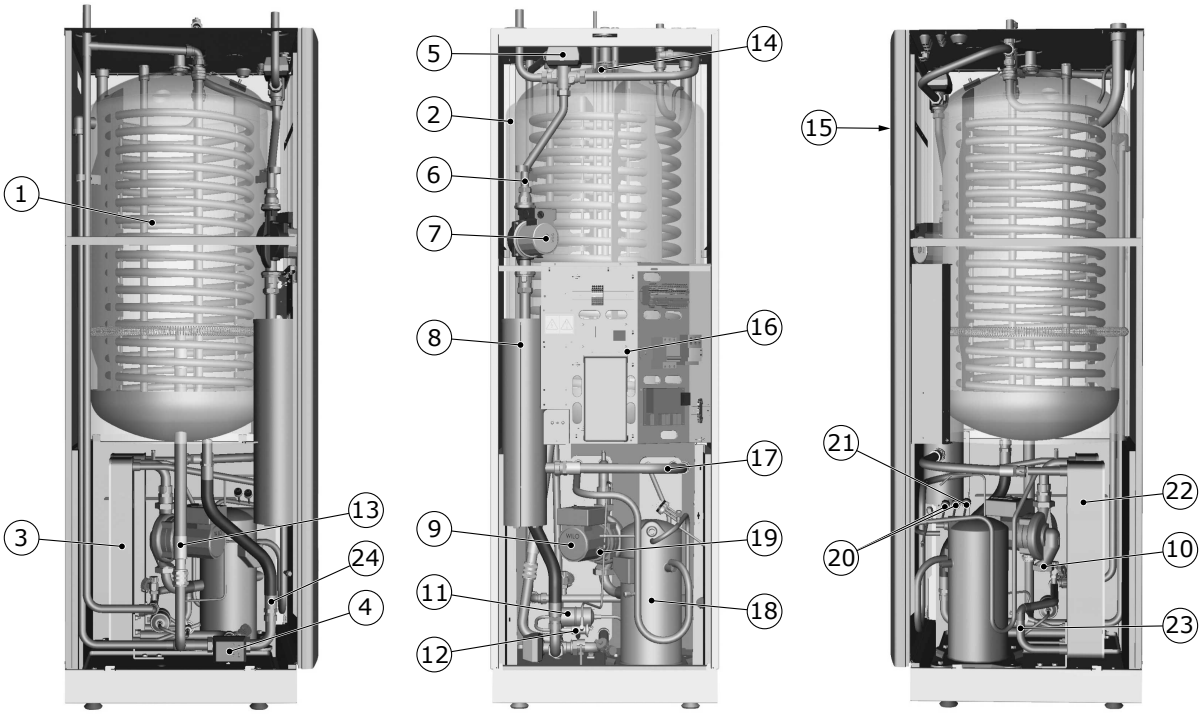


Figure 14. The components are shown above

Symbol explanation

1	Water heater, 180 litres	13	Brine out
2	Defrosting tank	14	Hot water temperature sensor (displays maximum temperature)
3	Evaporator, insulated	15	Control panel for control equipment
4	Exchange valve, defrosting	16	Electrical panel
5	Exchange valve, heating system	17	Heating system supply line
6	Supply line sensor	18	Compressor
7	Heating system circulation pump	19	Low pressure switch
8	Auxiliary heating, immersion heater	20	Operating pressure switches
9	Brine pump brine system	21	High pressure switch
10	Brine in	22	Condenser with primary side drain
11	Drying filter	23	Return pipe sensor, heating system
12	Expansion valve	24	Brine in to defrosting tank during defrosting

4.6 DHP-AL, DHP-AL Opti

4.6.1 Dimensions and connections

The brine pipes can be connected on either the left or right-hand sides of the heat pump.

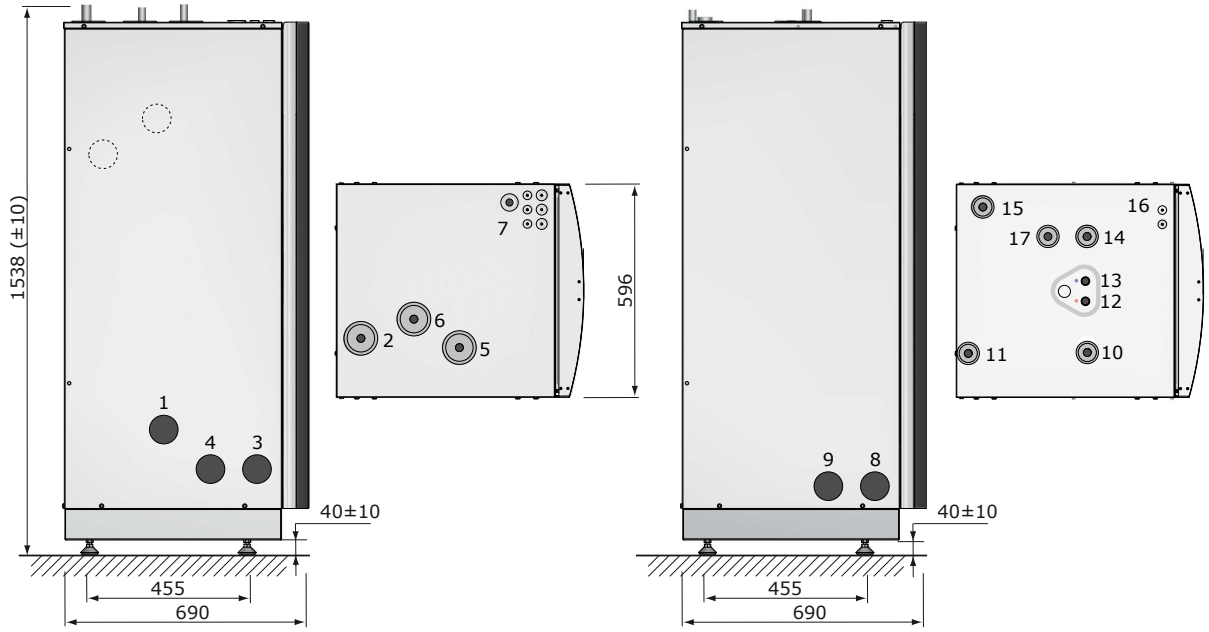


Figure 15. Dimensions and connections heat pump and water heater

Symbol explanation

Heat pump

1	Brine in, 28 Cu	5	Heating system supply pipe, 22 Cu: 6-10 kW, 28 Cu: 12 kW
2	Brine out, during normal operation, 28 Cu	6	Heating system return pipe, 22 Cu: 6-10 kW, 28 Cu: 12 kW
3	Brine out during defrosting to hwh pos 8, 28 Cu	7	Lead-in power and sensor lead
4	Return line from water heater pos 9, 28 Cu		

Symbol explanation

Water heater

8	Connection for brine out when defrosting from pos 3	13	Cold water line, 22 mm
9	Water heater, return pipe to pos 4	14	Supply to water heater coil
10	Bleed valve, at stainless steel water heater	15	Brine, expansion outlet when outdoor unit is positioned at high level
11	Brine out during defrosting, 28 Cu	16	Lead-in sensor lead
12	Hot water line, 22 mm	17	Safety valve for temperature and pressure (only applies to certain models)

4.6.2 Outdoor unit

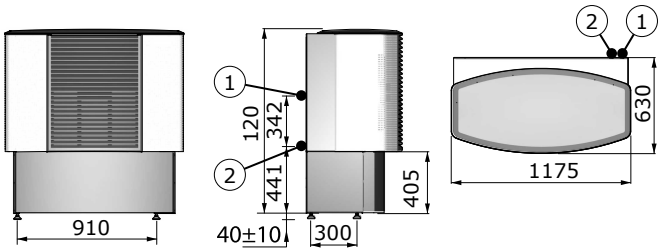


Figure 16. Outdoor unit, dimensions and connections.

Symbol explanation

1	Brine in, 28 Cu
2	Brine out, 28 Cu

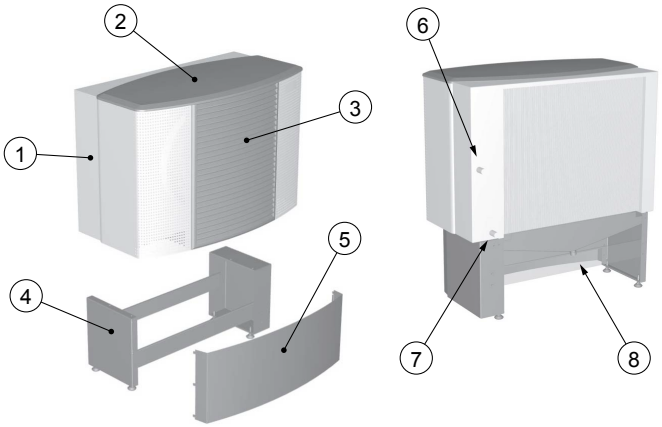


Figure 17. Outdoor unit and connections

Symbol explanation

1	Outdoor unit	5	Cover
2	Cover	6	Connection, brine in to outdoor unit
3	Front cover	7	Connection, brine out from outdoor unit
4	Stand	8	Connection, drain drip tray

Check that the delivery of the outdoor unit contains the following:

- Outdoor unit
- Disassembled stand
- Necessary screws, nuts and washers.
- Defrost sensor

4.6.3 Components

The component image below shows a schematic of what the inside of a heat pump looks like. There may be differences between different versions.

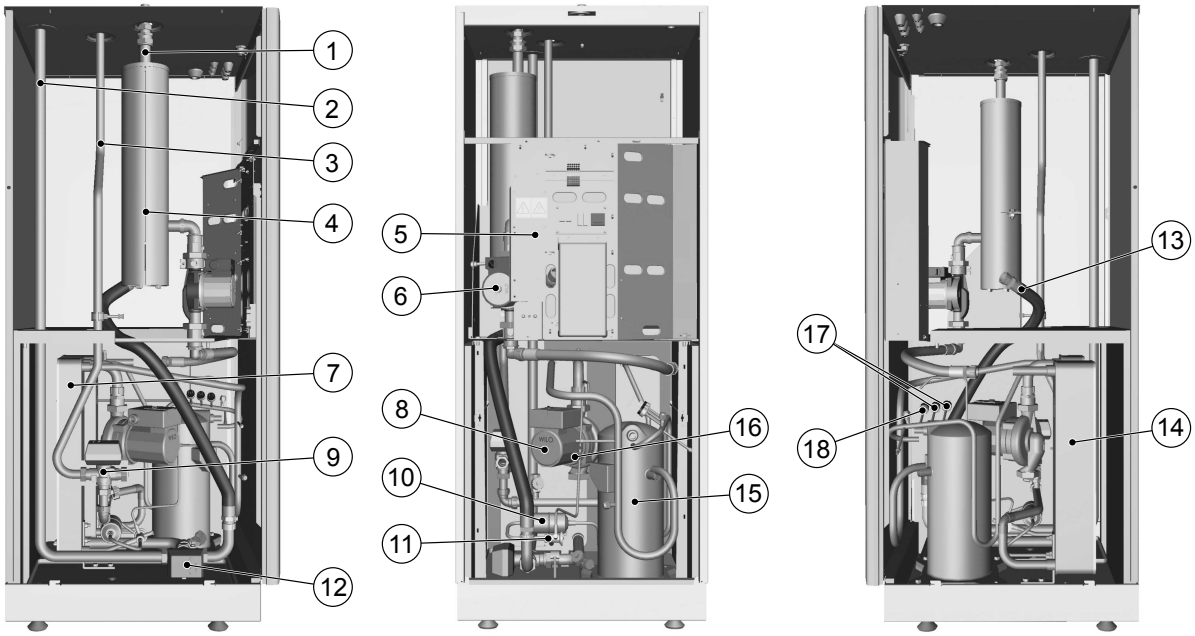


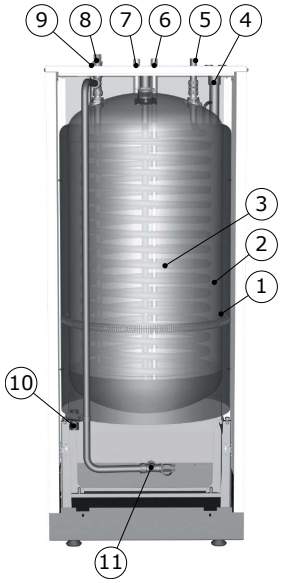
Figure 18. The components are shown above

Symbol explanation

1	Heating system supply pipe	10	Drying filter
2	Brine out to outdoor unit	11	Expansion valve
3	Return pipe, heating system	12	Shunt valve defrosting
4	Auxiliary heating, immersion heater	13	Brine in to defrosting tank during defrosting
5	Electrical panel	14	Condenser
6	Heating system circulation pump	15	Compressor
7	Evaporator	16	Low pressure switch

Symbol explanation

8	Circulation pump coolant system	17	Operating pressure switches
9	Exchange valve, heating system	18	High pressure switch



Symbol explanation

1	Defrosting tank
2	Water heater
3	TWS coil
4	Connection, expansion line when outdoor unit is positioned at high level
5	Connection, to TWS coil
6	Cold water line, 22 mm
7	Hot water line, 22 mm
8	Bleed valve, at stainless steel water heater
9	Connection, brine out, during defrost
10	Connection, brine from heat pump
11	Connection, return pipe to heat pump

4.7 Package contents

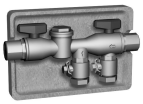
4.7.1 Delivery check

1. Check that there is no transport damage. The heat pump is packaged in cardboard.
2. Remove the packaging and check that the delivery contains the following components.

4.7.2 Sizes 4 kW - 10 kW

Table 2. Package contents, 4-10kW

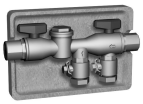
Part no.	Quantity	Name
086U2369 	1	Safety valve 9 bar 1/2"
086U2701 	1	Outdoor sensor
086U0896 	1	Safety valve 1.5 bar 1/2"
086U2824 	1	Expansion and bleed tank

Part no.	Quantity	Name
086U0026 	5	Rubber bellows for 22-32 mm hole
086U6033 	2	Flexible hose R20 L=550
086U6006 	1	Filler device DN25
086U3427 	1	Dirt filter with shut-off DN20

4.7.3 Sizes 12 kW - 16 kW

Table 3. Package contents, 12-16kW

Part no.	Quantity	Name
086U2369 	1	Safety valve 9 bar 1/2"
086U2701 	1	Outdoor sensor
086U0896 	1	Safety valve 1.5 bar 1/2"
086U2824 	1	Expansion and bleed tank
086U0026 	5	Rubber bellows for 22-32 mm hole
086U6034 	2	Flexible hose R25 L=550

Part no.	Quantity	Name
086U6007 	1	Filler device DN32
086U6005 	1	Dirt filter with shut-off DN25

4.8 Transporting the heat pump

Caution! During transportation or lifting of the entire heat pump, the front panel must always be installed as it locks the other panels construction.

Caution! The heat pump must always be transported and stored in a dry area. Secure the heat pump so that it cannot tip over during transportation.

When transporting indoors to the installation location it may be necessary to place the heat pump on its back. The time that the heat pump is transported on its back should be as short as possible. After the heat pump has been lifted up again it must stand upright for at least an hour before commissioning.

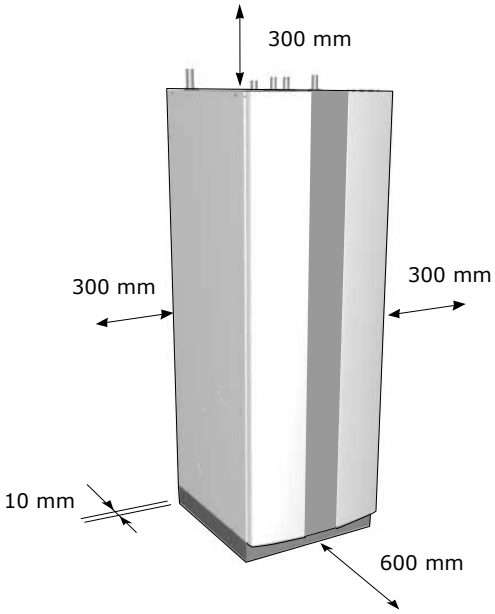
4.9 Space requirement

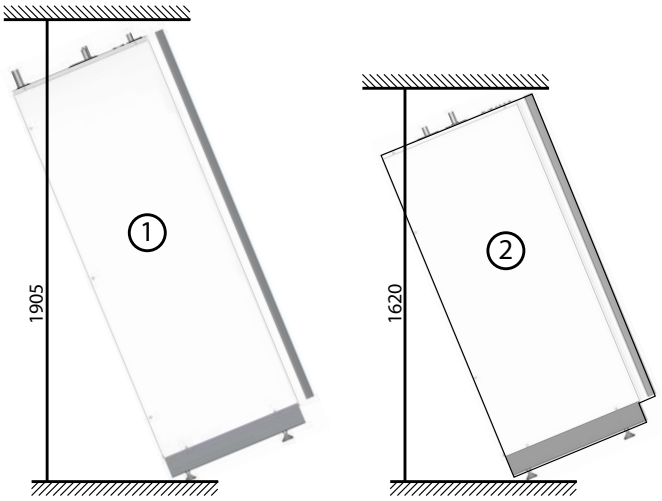
Caution! The heat pump must not be enclosed as the temperature inside the cabinet becomes extremely high.

To facilitate the installation and subsequent testing and maintenance there must be sufficient free space around the heat pump in accordance with the following dimensions:

- 300 mm on each side
- 300 mm above
- 600 mm in front

- 10 mm behind





Symbol explanation

1	DHP-H
	DHP-H Opti Pro
	DHP-C
	DHP-A
	DHP-A Opti
2	DHP-L
	DHP-L Opti
	DHP-AL
	DHP-AL Opti

Figure 19. Minimum headroom for heat pump installation

4.10 Recommended location

Caution! To avoid condensation problems for the brine lines, as short a brine line as possible is recommended indoors.

The heat pump should be located on a stable floor, preferably made of concrete. When locating the heat pump on a wooden floor this should be reinforced to take the weight of the heat pump including a filled water heater, see technical data for relevant heat pump. One solution is to place a thick metal plate, at least 6mm, under the heat pump. The metal plate should cover several joists spreading the weight of the heat pump over a larger area. If the heat pump is being installed in a newly-built house, this has normally been taken into account during construction, and the joists where the heat pump will be located have been reinforced. Always check that this has been carried out when installing into a newly-built house.

Avoid positioning the heat pump in a corner as the surrounding walls may amplify its noise. It is also important to adjust the heat pump using the adjustable feet so that it is horizontal to the base.

4.11 Space requirement, outdoor unit, DHP-A, DHP-AL

Caution! To ensure the function of the outdoor unit, there must be at least 300 mm of space behind and 1500 mm at the front.

Note! For maintenance work there must be approximately 300 mm of space at the sides of the outdoor unit.

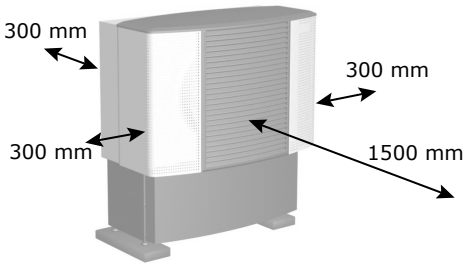


Figure 20. Necessary service space for outdoor unit.

4.12 Recommended location of outdoor unit, DHP-A, DHP-AL

When positioning the outdoor unit, note the following:

Caution! When the outdoor unit is defrosting, water will drip straight down under the unit. The area around the outdoor unit must therefore be properly drained in order to take the water (approximately 2 litres per defrost).

Caution! The outdoor unit's adjustable stand must be positioned on a secure base such as wooden sleepers, paving slabs or cast footings.

Note! The outdoor unit does not have to be positioned in any specific direction.

Note! Noise is produced from the outdoor unit when the fan is in operation, remember this when positioning to reduce disturbance in your own home as well as to any neighbours.

5 Drilling holes for brine pipes

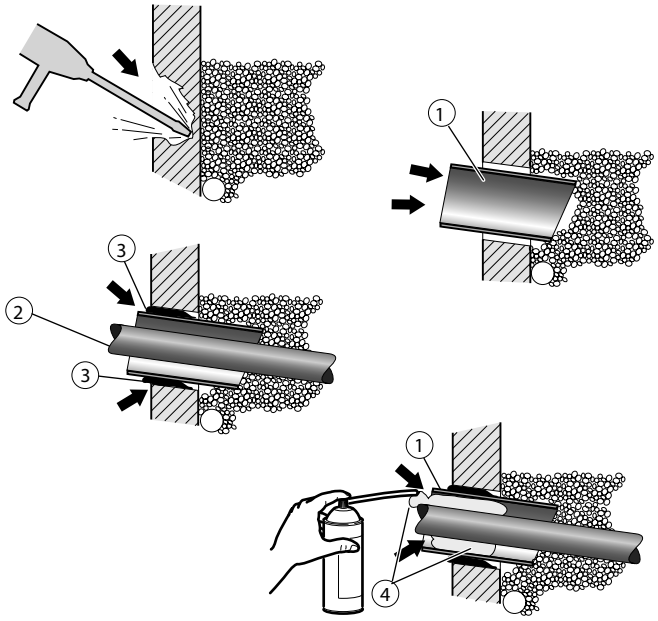
Caution! Ensure that the holes for the insert pipes are positioned so that there is room for the other installations.

Caution! The brine pipes shall have separate lead-ins. If the wall lead-ins are below the highest ground water level watertight lead-ins must be used.

The brine pipes must be insulated from the heat pump, through the walls and outside the house all the way to the collector so as to avoid condensation and prevent heat loss.

If the brine pipes are to be routed above ground, drill holes in the walls for them.

If the brine pipes are to be routed below ground see the instructions below.



Symbol explanation

1	Insert pipe
2	Brine pipe
3	Mortar
4	Sealant

Figure 21. Making holes

1. Drill holes in the wall for the insert pipes (1) for the brine pipes. Follow the dimension and connection diagrams. If there is any risk of groundwater infiltration at brine pipe lead-ins, watertight grommets must be used.
2. Position the insert pipes (1) in the holes sloping downwards. The inclination must be at least 1cm every 30cm. Cut them at an angle (as illustrated) so that rain water cannot get into the pipes.
3. Insert the brine pipes (2) into the insert pipes in the installation room.
4. Fill in the holes around the lines with mortar (3).
5. Ensure that the brine pipes (2) are centred in the insert pipes (1) so that the insulation is distributed equally on all sides.
6. Seal the insert pipes (1) with a suitable sealant (foam) (4).

6 Separating the heat pump

Note! Does not apply to DHP-L, DHP-L Opti, DHP-AL, DHP-AL Opti.

If there is a shortage of space when transporting the heat pump to the installation location it may be necessary to separate the heat pump unit and the water heater.

The following instruction describes how a heat pump is separated to transport the separate parts more easily.

Warning! Do not lift heavy equipment alone, always use two people for heavy lifting.

1. Remove the packaging.
2. Detach the front cover by twisting the catch 90° anti-clockwise, at the same time hold the front cover with one hand.
3. Tilt the front cover outwards.
4. Lift the front cover upwards to remove it from the heat pump.

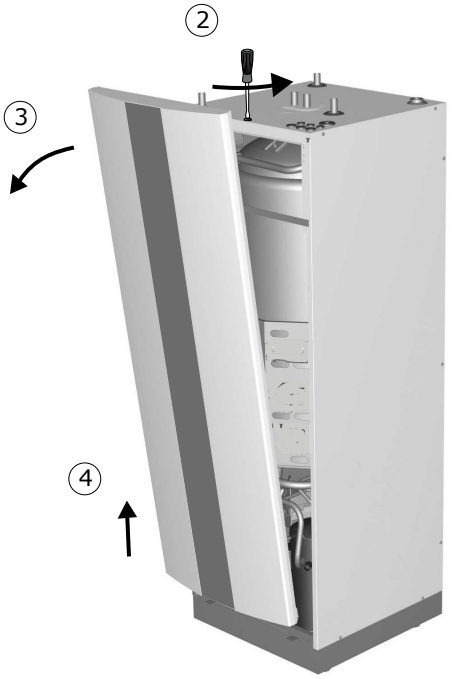


Figure 22. The front cover

5. Carefully pull the switch free from the control panel.
6. Unscrew the front stay bar and top panel.
7. Pull the side panels forward and then upwards and outwards to remove them.

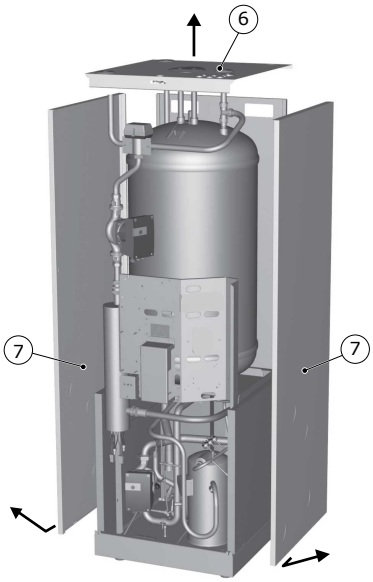


Figure 23. Top panel and side panels

8. Slacken off the screws that hold the rear panel and remove it.
9. Disconnect the electrical connectors at the exchange valve, circulation pump and electrical auxiliary heater.
10. Disconnect the cables for the following sensors at the electrical panel:
    - Supply line (301, 302)
    - Hot water (311, 312)
    - Top sensor (325, 326)
11. Unscrew the electrical panel's screws.
12. Turn the electrical panel through 180 degrees and place it in front of the heat pump.

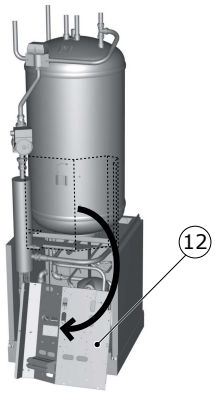


Figure 24. Electrical panel

13. Disconnect the T-pipe connector from the return line under the heater, see figure below.

14. Disconnect the flexible hose at the electrical auxiliary heater, see figure below.

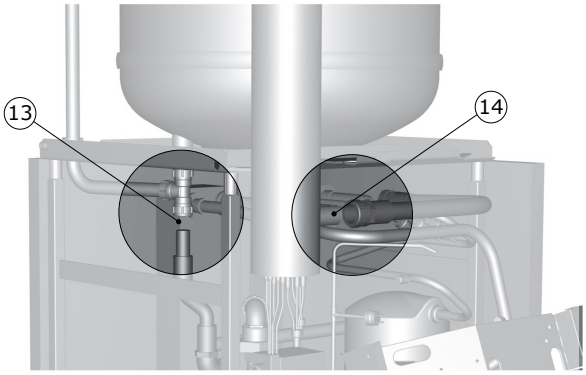


Figure 25. Connections

15. Unscrew the four screws in the corners that hold the water heater's bottom plate.

Warning! Always use two people for heavy lifting.

---

16. Lift off the unit with the water heater, pipe and electrical auxiliary heater.

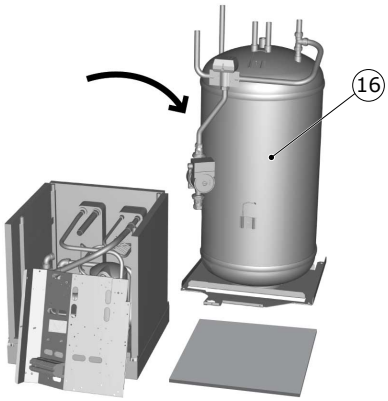


Figure 26. Separating

17. Put the unit down carefully on a floor protector.

7 Unpacking and installation

7.1 Setting up

Note! The heat pump has feet that can be adjusted to compensate for irregularities in the surface on which it is sitting. If the surface is so irregular that the feet cannot compensate for it, the installation engineer must remedy this.

Note! It is recommended that the condensation drain is installed from the drip tray's drain pipe by lying the heat pump down. The drain pipe opens through a hole in the base plate and has a ?10 mm hose connection.

Note! If the heat pump has been laid down it is recommended that it stands upright for at least an hour before commissioning.

1. Move the heat pump to the installation site. If there is little space the heat pump can be unpacked and separated.
2. Remove the packaging.

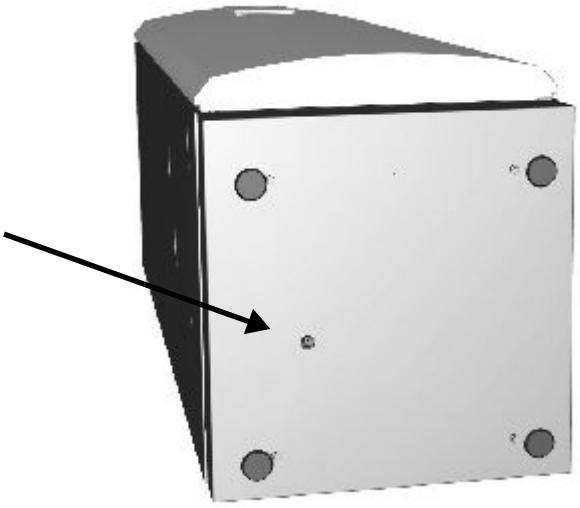


Figure 27. Condensation drain connection

3. Install a condensation drain on the connection in the base plate if required.
4. Set up the heat pump in the installation site.

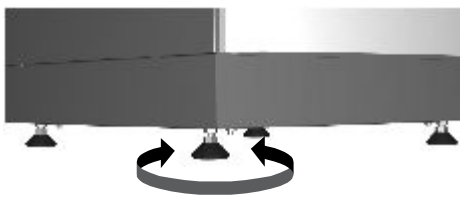


Figure 28. Adjusting the feet

5. Adjust the feet so that it is horizontal.

7.2 Removing the front cover

Caution! Do not damage the electrical wiring for the display when the front cover is removed!

To install the heat pump the front cover must be removed.

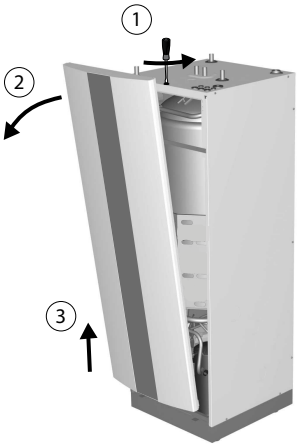


Figure 29. Removing the front cover

1. Press against the front cover and turn the catch 90° degrees anti-clockwise to release the front cover.
2. Tilt the front cover outwards.
3. Lift the front cover upwards to remove it from the heat pump.

7.3 Unpacking and installing the outdoor unit

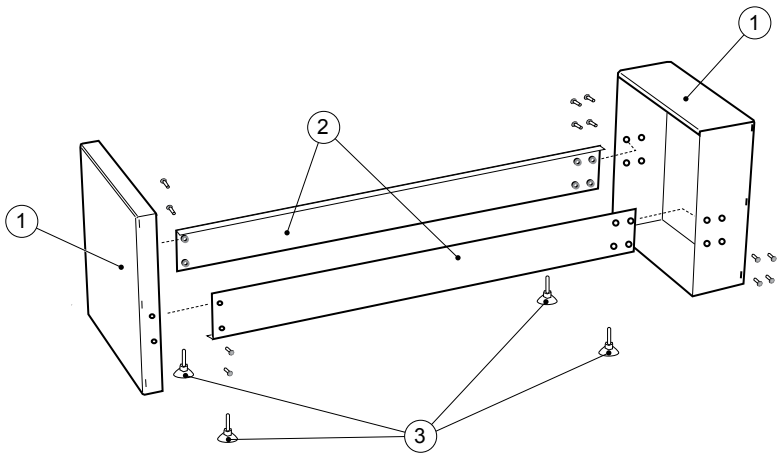
Note! Applies from AtriamodellernaDHP-A, DHP-A Opti, DHP-AL, DHP-AL Opti.

The outdoor unit is packed and delivered in a crate.

1. Start by unpacking the unit from the crate.
2. Check that the delivery is complete, it must contain the outdoor unit, front cover, cover, panel as well as a disassembled stand including necessary screws, nuts and washers.

7.3.1 Assembling the stand

1. Screw the two horizontal struts together (2) using the two ends (1) as illustrated below. Use 10 x M6x10 screws. The curved edges of the horizontal struts must be facing inwards.



Symbol explanation

1	Ends
2	Strut
3	Feet

Figure 30. Assembling the stand

1. Screw the adjustable feet (3) into the holes under the ends.

7.3.2 Preparing the outdoor unit

While the outdoor unit remains on the pallet it should be prepared for placing on the stand. Carry out the following:

1. There are three M6x20 screws on the lower edge of the outdoor unit. Unscrew them so that 2-3 mm of the thread remains. Use a torx TX25 screwdriver, or equivalent.

Caution! Do not lift the outdoor unit by its side panels when it is to be raised or moved.

---

2. Raise the outdoor unit.
3. Remove the side plates. They are held in place by clamps and so are removed by pulling outwards.
4. Remove all four screwed lifting eyes. Use a 13 mm wrench, or equivalent.

7.3.3 Assembling the outdoor unit on the stand

1. Lift the outdoor unit into the place on the stand.

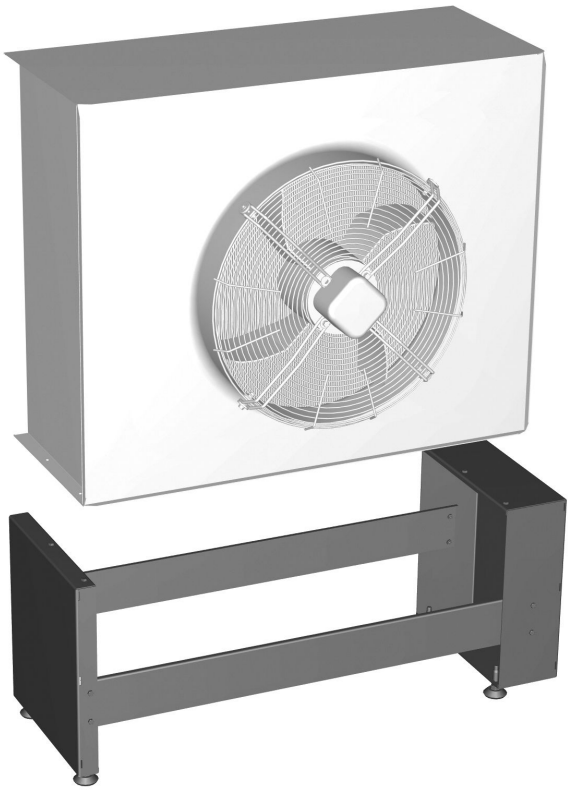


Figure 31. Lift the outdoor unit onto the stand

2. Screw the outdoor unit onto the stand. Use 4 x M6x20 screws. It may be necessary to push and pull the stand slightly in order to get the screw holes to align.

Caution! When filling the brine system the outdoor unit must be bled using the bleed screws on the connecting pipes inside the side covers. We recommend that you return to this instruction after the brine system has been filled.

---

3. Reinstall the side panels.

7.3.4 Assembling the front cover

1. Hook the lower edge of the front cover onto at least one of the three screws in the bottom edge of the stand.
2. Secure the upper edge of the front panel temporarily in the centre hole. Use 1 x M6x15 torx TX25.
3. Align all the three screws in the lower edge.
4. Screw the three screws in the lower edge fully. Use a torx TX25 screwdriver, or equivalent.
5. Secure the front panel's upper edge with the 2 x remaining M6x15 torx TX25, see figure below.

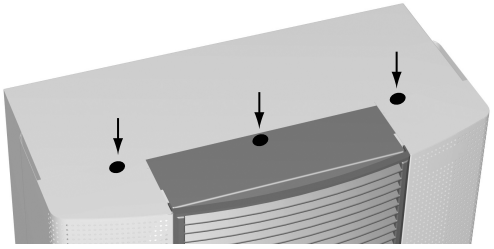


Figure 32. Secure the cover

7.3.5 Install the cover

1. Hook the cover at the front edge on the front cover.

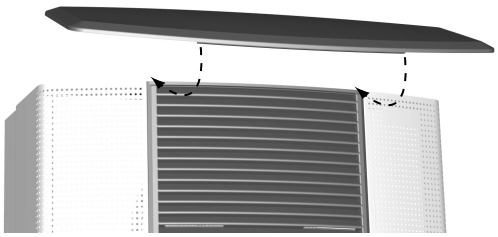


Figure 33. Hook the front cover into place

1. Secure the cover using a screw on each side. Use 2 x cross head screws.

If the cover does not align with the side cover plates it may be necessary to drill new 3 mm holes:

- Mark for the new holes
- Lift off the cover
- Drill the holes
- Install and screw the cover into place

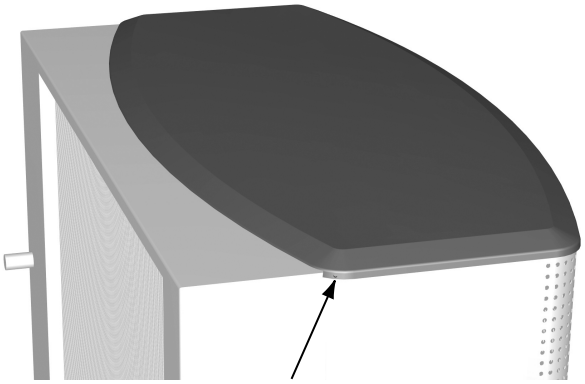


Figure 34. Screw the front cover into place

7.3.6 Install cover

1. Hook the cover onto the stand.

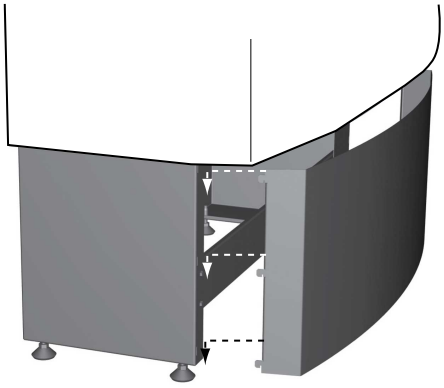


Figure 35. Hook the cover onto the stand.

7.3.7 Assembling the defrost sensor

Figure 36. Hook the defroster sensor into place

1. Slide the mounting for the defroster sensor into the hole on the reverse of the outdoor unit until the cover hooks into place on the edge.
2. Secure the defroster sensor at the bottom of the mounting using a cable tie.

The outdoor unit is now mounted and can be adjusted on the site where it should be set up.

7.3.7.1 Conversion table

The conversion table for the defrost sensor is the same as the one used for the outdoor unit sensor (150 ohm).

Note! When reading the resistance of the sensor, the sensor contacts must first be disconnected from the control equipment.

Table 4. Conversion table, outdoor sensor / defrost sensor

Outdoor sensor / defrost sensor	
°C	ohm, Ω
-30	1884
-25	1443
-20	1115
-15	868
-10	681
-5	538
0	428
5	343
10	276
15	224
20	183
25	150
30	124
35	103
40	86

8 Piping installation

Warning! As the water temperature in DHP-H Opti Pro becomes extremely hot, a mixer valve must be installed between the cold water and hot water pipes to ensure a lower domestic hot water temperature.

Warning! Danfoss SP (1-phase) heat pumps have a factory installed safety valve for temperature and pressure, (10 bar 90-95° C), in accordance with the requirements in Great Britain. This valve is located in the water tank and may not be used for any purpose other than connecting the outlet pipe.
Also note that for heat pump DHP-H Opti Pro SP it is imperative that the hot water temperature is changed from default setting 95° C to 85° C.

Caution! Piping installation must be carried out in accordance with applicable local rules and regulations. The hot water tank must be equipped with an approved safety valve.

Caution! To prevent leaks, ensure that there are no stresses in the connecting pipes!

Caution! It is important that the heating system is bled after installation. Bleed valves must be installed where necessary.

Note! Ensure that the pipe installation is carried out in accordance with the dimensions and connection diagrams.

Note! Configure the heat pump for the desired system solution in the SERVICE\ADD. HEATER\EXTERNAL ADDITION menu.

8.1 Connection heat transfer fluid

8.1.1 Connection heat transfer fluid

DHP-H, DHP-H Opti Pro, DHP-C

The image shows the principles of a piping installation with all components.

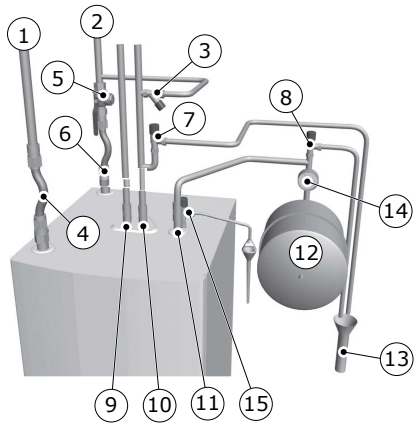


Figure 37. Principle solution for a piping installation

Symbol explanation

1	Supply line
2	Return line
3	Filler tap
4	Flexible hose
5	Shut-off cock and strainer
6	Flexible hose
7	Safety valve, 9 bar cold water
8	Safety valve
9	Hot water (hw)
10	Cold water (cw)
11	Expansion (Exp)
12	Expansion tank
13	To drain
14	Pressure gauge
15	Safety valve for temperature and pressure (only applies to certain models)

8.1.2 Connection heat transfer fluid
DHP-L, DHP-L Opti

The image shows the principles of a piping installation with all components.

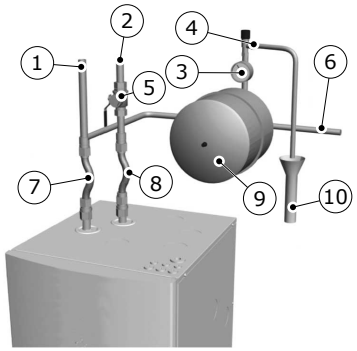


Figure 38. Principle solution for a piping installation

Symbol explanation

1	Supply line
2	Return line
3	Pressure gauge
4	Safety valve
5	Shut-off cock and strainer
6	Connection to any water heaters
7	Flexible hose
8	Flexible hose
9	Expansion tank
10	To drain

8.1.3 Connection heat transfer fluid
DHP-A, DHP-A Opti

The image shows the principles of a pipe installation with all components

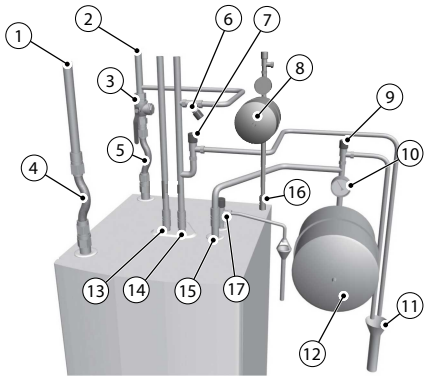


Figure 39. Principle solution for a piping installation

Symbol explanation

1	Supply line
2	Return line
3	Shut-off cock and strainer
4	Flexible hose
5	Flexible hose
6	Filler tap
7	Safety valve, 9 bar cold water
8	Expansion tank
9	Safety valve
10	Pressure gauge
11	To drain
12	Expansion tank
13	Hot-water
14	Cold water
15	Exp
16	Exp BRINE
17	Safety valve for temperature and pressure (only applies to certain models)

8.1.4 Connection heat transfer fluid

DHP-AL, DHP-AL Opti

The image shows the principles of a piping and brine installation with all components.

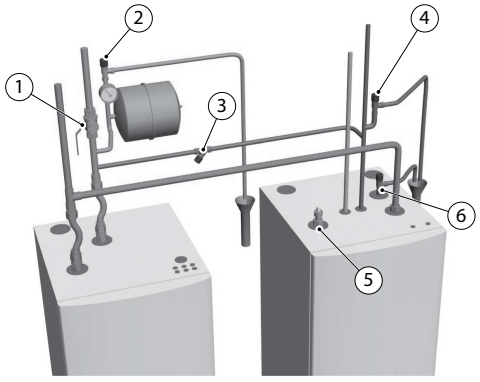


Figure 40. Principle solution for a pipe and brine installation

Symbol explanation

1	Shut-off cock and strainer
2	Safety valve
3	Filler tap
4	Safety valve 9 bar
5	Bleed valve at stainless steel water heater
6	Safety valve for temperature and pressure (only applies to certain models)

8.2 System solution 1

In system solution 1 the heat pump can produce both heating and hot water with the compressor and the integrated auxiliary heater. Production of heating and hot water cannot occur at the same time because the exchange valve for heating/hot water is positioned after the auxiliary heater.

The integrated auxiliary heater carries out peak heating charging (antilegionella function) in those operating modes that permit auxiliary heat.

For system solution 1, select the factory setting in menu SERVICE\AUX. HEATER\EXTERNAL ADDITION:
EXTERNAL AUX. HEATER = 0 (Off)
REV.V. HOT WATER = INT

8.2.1 Example system solution 1

System solution for DHP-H, DHP-H Opti Pro, DHP-C, DHP-A, DHP-A Opti.

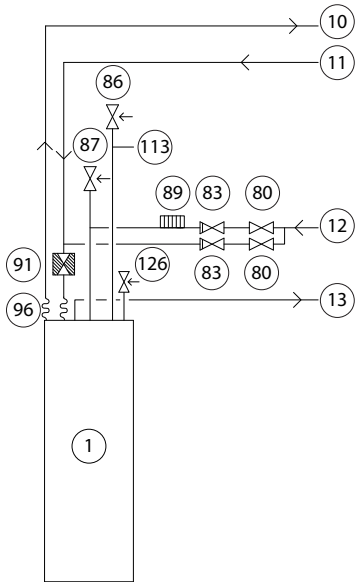


Figure 41. Example system solution 1

Symbol explanation

1	Heat pump
10	Supply line
11	Return line
12	Cold water
13	Hot-water
80	Shut-off valve
83	Non-return valve
86	Safety valve expansion heating system
87	Safety valve cold water 9 bar
89	Vacuum valve
91	Strainer
96	Flexible hose
113	Expansion heating system
126	Safety valve for temperature and pressure (only applies to certain models)

8.2.2 Example system solution 1

System solution for DHP-L, DHP-L Opti

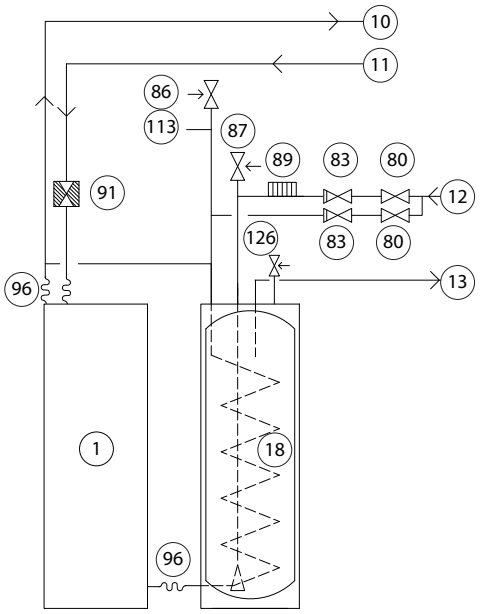


Figure 42. Example system solution 1

Symbol explanation

1	Heat pump
10	Supply line
11	Return line
12	Cold water
13	Hot-water
18	Water heater
80	Shut-off valve
83	Non-return valve
86	Safety valve expansion heating system
87	Safety valve cold water 9 bar
89	Vacuum valve
91	Strainer
96	Flexible hose
113	Expansion heating system
126	Safety valve for temperature and pressure (only applies to certain models)

8.2.3 Example system solution 1

System solution for DHP-AL, DHP-AL Opti.

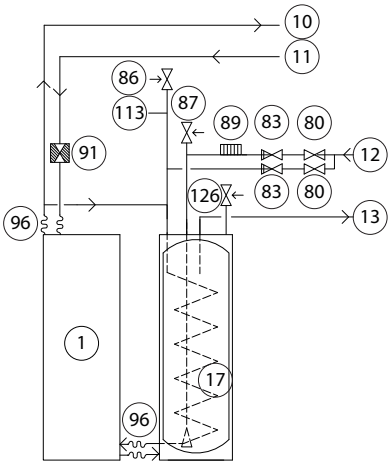


Figure 43. Example system solution 1

Symbol explanation

1	Heat pump
10	Supply line
11	Return line
12	Cold water
13	Hot-water
17	Water heater (DHP-AL)
80	Shut-off valve
83	Non-return valve
86	Safety valve expansion heating system
87	Safety valve cold water 9 bar
89	Vacuum valve
91	Strainer
96	Flexible hose
113	Expansion heating system
126	Safety valve for temperature and pressure (only applies to certain models)

8.3 System solution 2

In system solution 2, the heat pump can produce both heat and hot water and an external auxiliary heater (oil boiler, electric boiler, district heating or similar) supports heat production but not hot water production. The exchange valve for heating/hot water is located ahead of the external auxiliary heater, which allows the production of heating and hot water at the same time.

The integrated auxiliary heater can be used for heating and hot water production as well as for antilegionella. The values of the integrals, A2 and A3 are used to select if the external auxiliary heater is to step in before or after the integrated electrical auxiliary heater.

The heat pump control computer also controls an additional shunt located after the external addition.

For system solution 2, select in menu SERVICE\AUX. HEATER\EXTERNAL ADDITION:

EXT.AUX.HEATER = ON

REV.V. HOT WATER = INT

8.3.1 Example system solution 2

System solution for DHP-H, DHP-H Opti Pro, DHP-C, DHP-A, DHP-A Opti.

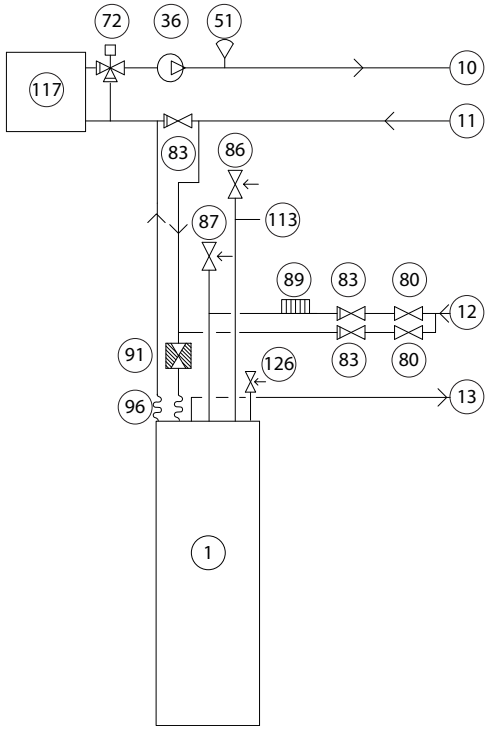


Figure 44. Example system solution 2

Symbol explanation

1	Heat pump
10	Supply line
11	Return line
12	Cold water
13	Hot-water
36	Circulation pump
51	Supply line sensor, moved out from heat pump
72	Additional shunt
80	Shut-off valve
83	Non-return valve
86	Safety valve expansion heating system
87	Safety valve cold water 9 bar
89	Vacuum valve
91	Strainer
96	Flexible hose
113	Expansion heating system
117	External auxiliary heater
126	Safety valve for temperature and pressure (only applies to certain models)

8.3.2 Example system solution 2

System solution for DHP-L, DHP-L Opti.

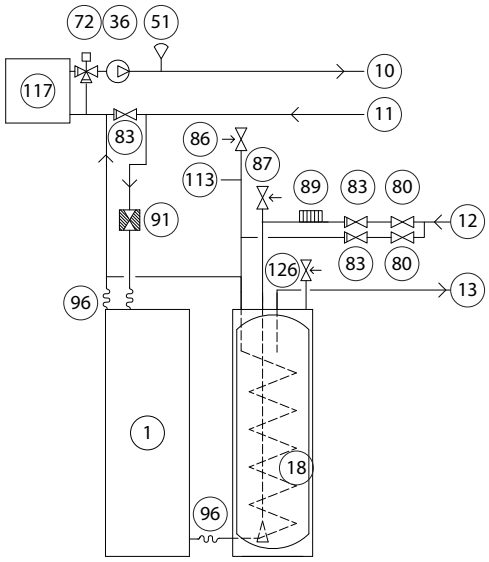


Figure 45. Example system solution 2

Symbol explanation

1	Heat pump
10	Supply line
11	Return line
12	Cold water
13	Hot-water
18	Water heater
36	Circulation pump
51	Supply line sensor, moved out from heat pump
72	Additional shunt
80	Shut-off valve
83	Non-return valve
86	Safety valve expansion heating system
87	Safety valve cold water 9 bar
89	Vacuum valve
91	Strainer
96	Flexible hose
113	Expansion heating system
117	External auxiliary heater
126	Safety valve for temperature and pressure (only applies to certain models)

8.3.3 Example system solution 2

System solution for DHP-AL, DHP-AL Opti.

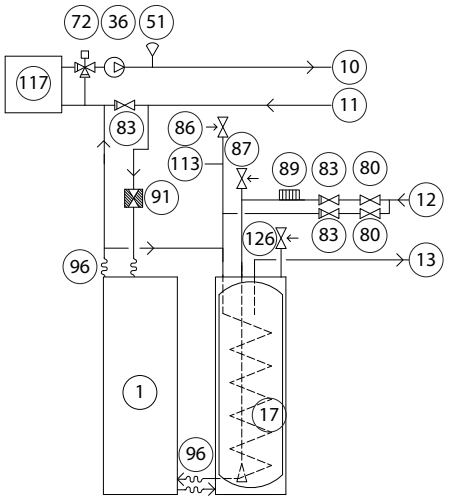


Figure 46. Example system solution 2

Symbol explanation

1	Heat pump
10	Supply line
11	Return line
12	Cold water
13	Hot-water
17	Water heater (DHP-AL)
36	Circulation pump
51	Supply line sensor, moved out from heat pump
72	Additional shunt
80	Shut-off valve
83	Non-return valve
86	Safety valve expansion heating system
87	Safety valve cold water 9 bar
89	Vacuum valve
91	Strainer
96	Flexible hose
113	Expansion heating system
117	External auxiliary heater
126	Safety valve for temperature and pressure (only applies to certain models)

8.4 System solution 3

In system solution 3, the heat pump can produce both heat and hot water and an external auxiliary heater (oil boiler, district heating or similar) supports heat and hot water production and can support antilegionella. The exchange valve for heating/hot water is located after the external auxiliary heater, which prevents the production of heating and hot water at the same time.
The integrated auxiliary heater can be used for heating and hot water production as well as for antilegionella.
The parameter "TOPH.AUX" is used to determine if the external or internal auxiliary heater produces antilegionella.
The values of the integrals, A2 and A3 are used to select if the external auxiliary heater is to step in before or after the integrated electrical auxiliary heater.
The heat pump control computer also controls an additional shunt located after the external addition.
For system solution 3, select in menu SERVICE\AUX. HEATER\EXTERNAL ADDITION:
EXT.AUX.HEATER = ON
REV.V. HOT WATER = EXT

8.4.1 Example system solution 3

System solution for DHP-H, DHP-C, DHP-A, DHP-A Opti.

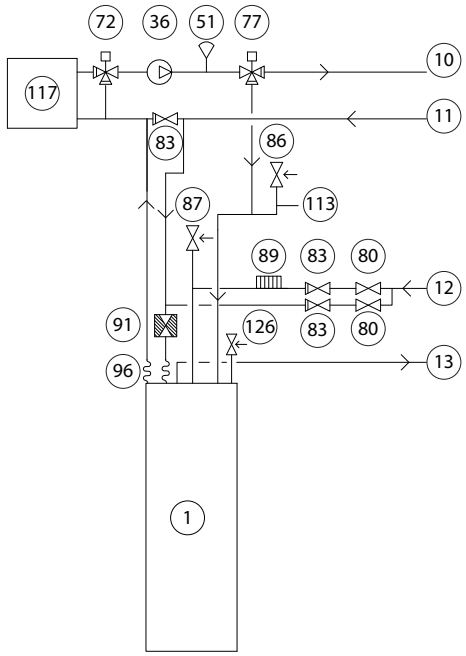


Figure 47. Example system solution 3

Symbol explanation

1	Heat pump
10	Supply line
11	Return line
12	Cold water
13	Hot-water
36	Circulation pump
51	Supply line sensor, moved out from heat pump
72	Additional shunt
77	Reversing valve
80	Shut-off valve
83	Non-return valve
86	Safety valve expansion heating system
87	Safety valve cold water 9 bar
89	Vacuum valve
91	Strainer
96	Flexible hose
113	Expansion heating system
117	External auxiliary heater
126	Safety valve for temperature and pressure (only applies to certain models)

8.4.2 Example system solution 3

System solution for DHP-L, DHP-L Opti.

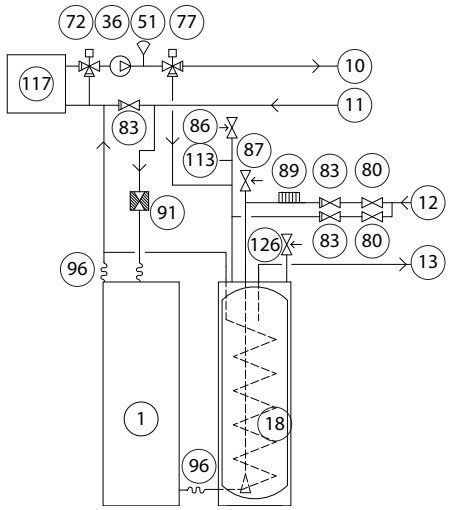


Figure 48. Example system solution 3

Symbol explanation

1	Heat pump
10	Supply line
11	Return line
12	Cold water
13	Hot-water
18	Water heater
36	Circulation pump
51	Supply line sensor, moved out from heat pump
72	Additional shunt
77	Reversing valve
80	Shut-off valve
83	Non-return valve
86	Safety valve expansion heating system
87	Safety valve cold water 9 bar
89	Vacuum valve
91	Strainer
96	Flexible hose
113	Expansion heating system
117	External auxiliary heater
126	Safety valve for temperature and pressure (only applies to certain models)

8.4.3 Example system solution 3

System solution for DHP-AL, DHP-AL Opti.

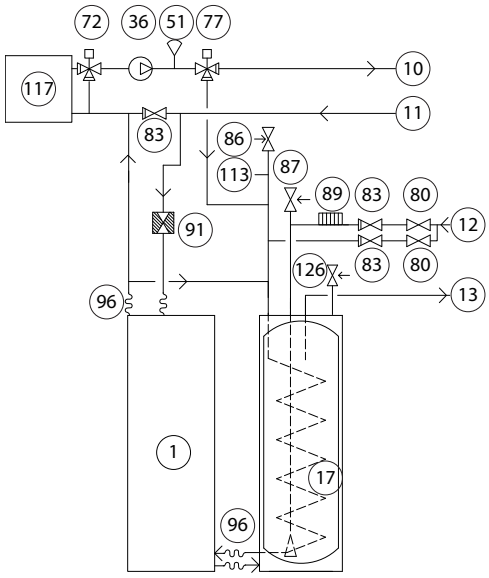


Figure 49. Example system solution 3

Symbol explanation

1	Heat pump
10	Supply line
11	Return line
12	Cold water
13	Hot-water
17	Water heater (DHP-AL)
36	Circulation pump
51	Supply line sensor, moved out from heat pump
72	Additional shunt
77	Reversing valve
80	Shut-off valve
83	Non-return valve
86	Safety valve expansion heating system
87	Safety valve cold water 9 bar
89	Vacuum valve
91	Strainer
96	Flexible hose
113	Expansion heating system
117	External auxiliary heater
126	Safety valve for temperature and pressure (only applies to certain models)

8.5 Safety valves

Caution! Radiator systems with a closed expansion tank must also be equipped with an approved pressure gauge and safety valve, minimum DN 20, 1.5 bar opening pressure, or according to country specific requirements.

Caution! Cold and hot water pipes and overflow pipes from safety valves must be made of heat resistant and corrosion-resistant material, e.g. copper. The safety valve overflow pipes must have an open connection to the drain and visibly flow into this in a frost-free environment.

Caution! The connecting pipe between the expansion tank and the safety valve must slope continuously upwards. A continuous upwards slope means that the pipe must not slope downwards from the horizontal at any point.

8.6 Noise information

8.6.1 Flexible hoses

Caution! The press sleeves may never be used as a counterhold when tightening connections.

All pipes should be routed in such a way that vibrations cannot be transmitted from the heat pump through the piping and out into the building. This also applies to the expansion pipe. We recommend that flexible hoses are used for all pipe connections to avoid the transmission of vibrations. Flexible hoses are available to purchase as accessories. The figures below show how appropriate and inappropriate installations look using this type of hose.

To avoid noise caused by pipe mounting, a rubber-coated pipe clamp should be used to prevent the transmission of vibrations. However, installation should not be too rigid and the pipe clamp must not be too tight.

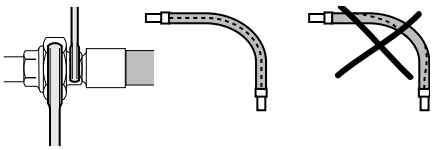


Figure 50. Do not twist the flexible hoses as they are installed. At threaded connections, use a counterhold spanner

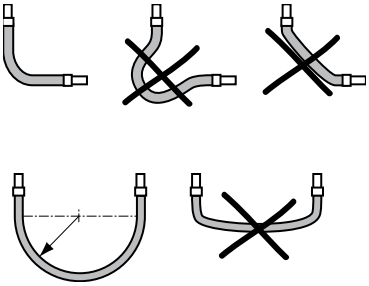


Figure 51. Cut the hose to the correct length to avoid excess bowing-out or stretching at bends.

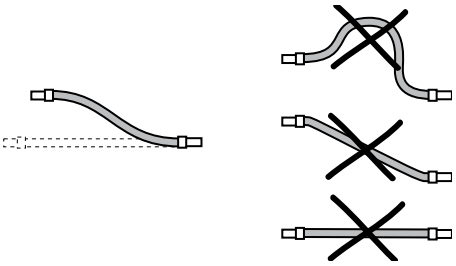


Figure 52. Cut the hose to the correct length to avoid excess bowing-out or stretching and offset the ends so that the hose is installed completely straight.

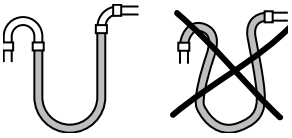


Figure 53. Use fixed pipe bends to avoid excess stress on bends next to connections

8.6.2 Preventative measures

Some of the following points can also be used when troubleshooting.

- Do not install heat pumps on walls adjoining bedrooms.

- Ensure that all pipes are elastically suspended, with mountings as illustrated or similar. This is so that the rubber (or similar material) compresses 1 to 2 mm under vibration. It is not recommended to suspend the pipes from too many points, as the force at each mounting is then not sufficient.

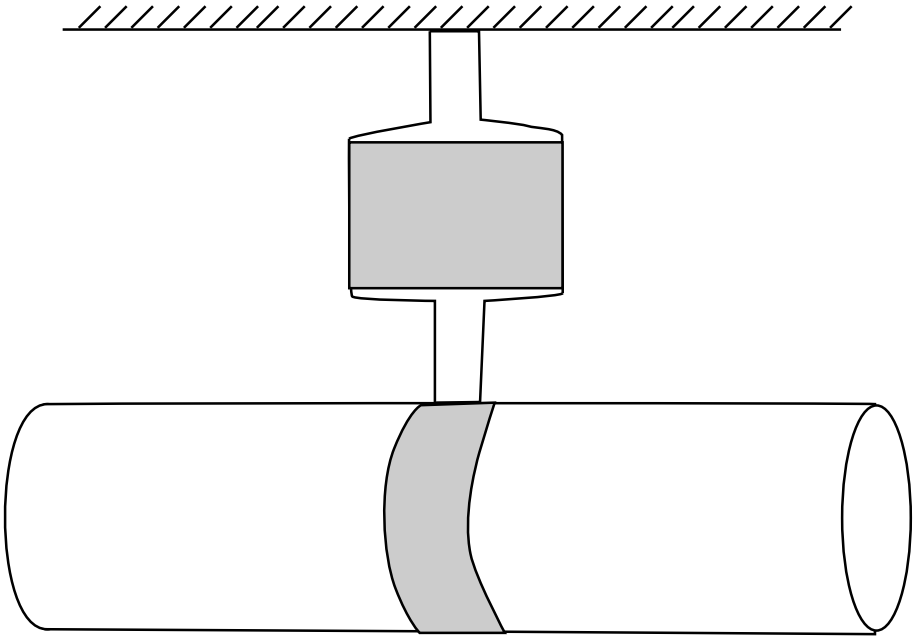


Figure 54. Elastic pipe suspension.

- If the heat pump is located indoors and the ceiling in the area is unsuitable to suspend the aforementioned pipe mountings, set up (or construct) special stands on the floor from which the pipes can be suspended.
- Ensure that pipe lines do not lie against walls that they run along and that foam insulation is wrapped around the entire pipe, not just on top of it.
- Pipes inside the heat pump must not be against each other (if they are, clamp and secure suitable rubber, pulling the pipes apart by hand only helps temporarily).
- If the heat pump is on an unstable surface, position rubber feet designed for its weight underneath.
- If necessary, use rubber straps to secure flexible hoses in position, so that they do not lie against each other or create vibration bridges.
- Ensure that electrical wiring is not put under strain, if it is it creates vibration bridges.
- If possible, install the heat pump in a location that is sound insulated from areas that are frequented by residents.

Soundproofing measures to carry out afterwards:

- Go through the aforementioned points and improve if possible.
- Hood for compressor (most effective for high frequencies).
- Improve the acoustic environment of the heat pump by installing acoustic panels on the walls and ceiling.
- In some instances, it is recommended that the heat pump is moved to another area.

8.7 Connecting cold and hot water lines

1. Connect the cold water and hot water pipes with all the necessary components according to the connection diagram for the relevant system.

8.8 Connecting the heating system supply and return lines

For information on how flexible hoses should be installed.

1. Connect the supply pipe with a flexible hose connection and with all the necessary components.
2. Connect the return pipe with a flexible hose connection and with all the necessary components including a filter.
3. Insulate the supply and return lines.
4. Connect the expansion tank to the expansion outlet (22mm Cu) on the top of the heat pump.

8.9 Filling the water heater and heating system

1. Fill the water heater with cold water by opening the filler valve that is on the valve pipe.
2. Bleed by opening one of the hot water taps.
3. Then fill the water heater coil and the heating system with water through the filling valve to a pressure of approx. 1 bar.

8.10 Bleeding the heating system

1. Open all radiator valves fully.
2. Bleed all radiators.
3. Refill the heating system to a pressure of approximately 1 bar.
4. Repeat the procedure until all air has been removed.
5. Leave the radiator valves fully open.

9 Electrical Installation

DANGER! Electrical voltage! The terminal blocks are live and can be highly dangerous due to the risk of electric shock. All power supplies must be isolated before electrical installation is started. The heat pump is connected internally at the factory, for this reason electrical installation consists mainly of the connection of the power supply.

Caution! Electrical installation may only be carried out by an authorized electrician and must follow applicable local and national regulations.

Caution! The electrical installation must be carried out using permanently routed cables. It must be possible to isolate the power supply using an all-pole circuit breaker with a minimum contact gap of 3 mm. (The maximum load for externally connected units is 2A).

Note! Electrical connection can also cause noise so this installation must be carried out appropriately. An appropriate installation is where there is approximately 300 mm free cable between the heat pump and the building. It is inappropriate to bolt trunking between the heat pump and the wall. This is because vibrations can then be transmitted from the heat pump through the trunking to the walls of the house.

9.1 Cable connection

- When the cable is connected to the terminal block a screwdriver is used to open the terminal block, see figure below.

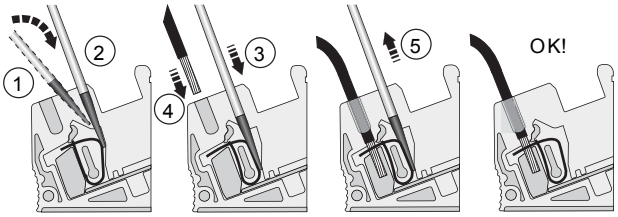


Figure 55. Connecting cable to terminal block

9.2 Electrical components

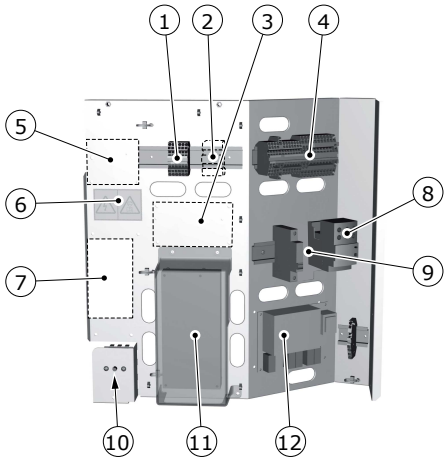


Figure 56. The location of the components on the electrical panel

Symbol explanation

1	Terminal block (applies to the expansion card)
2	Terminal block (applies to DHP-A, DHP-AL)
3	Defrost card (applies to DHP-A, DHP-AL)
4	Terminal block
5	Space for Danfoss Online
6	Warning decal
7	Space for expansion card
8	Motor protection for compressor
9	Automatic fuses
10	Resetting overheating protection
11	Control computer
12	Soft starter card

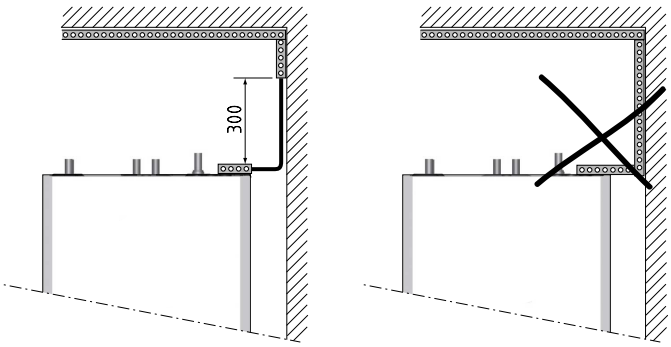


Figure 57. Recommended distance between trunking on the wall and trunking on the heat pump is 300 mm

9.3 Connecting external supply voltage

DANGER! Electrical voltage! The power cable may only be connected to the terminal block intended for this purpose. No other terminal blocks may be used!

1. Route the power cable through the opening in the top panel of the heat pump to the terminal blocks.
2. Connect the power cable according to the electrical instructions.

9.4 Position and connect outdoor sensors

Caution! The outdoor sensor uses protected extra low voltage. Follow the specific installation instructions for the outdoor sensor!

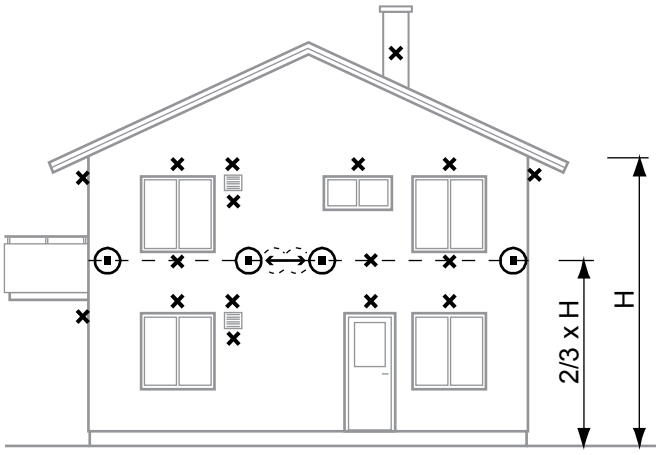


Figure 58. Positioning the outdoor sensor

Recommended location

Unsuitable location

- Position the outdoor sensor on the north or north west side of the house.
- To measure the outdoor temperature as accurately as possible, the sensor must be positioned 2/3 of the way up the facade on houses up to three storeys high. For higher buildings, the sensor should be positioned between the second and third storeys. Its location must not be completely protected from the wind but not in a direct draft. The outdoor sensor should not be placed on reflective panel walls.
- The sensor must be positioned at least 1 m from openings in the walls that emit hot air.
- If the sensor cable is connected through a pipe, the pipe must be sealed so that the sensor is not affected by outgoing air.

The outdoor sensor is connected by a two core cable. A maximum cable length of 50 m applies for a cross section of 0.75 mm2. For greater lengths a cross section of 1.5 mm2 is used, up to a maximum of 120 m.
Then connect the sensor to the heat pump's control system according to the electrical instructions.

9.5 Changing the language in the control computer

If necessary, change the language in the control computer menu system

1. Ensure that the main circuit breaker is on.
2. Open the INFORMATION menu.
3. Change language in the control computer menu INFORMATION -> LANGUAGE - ENGLISH, select language with + or -.

9.6 Selection of system solution and connection of external aux. heater

Note! Configure the heat pump for the desired system solution in the SERVICE\ADD. HEATER\EXTERNAL ADDITION menu.

Also see section Piping installation and Menyinformation.

9.6.1 System solution 1

The heat pump is delivered configured for system solution 1.

9.6.2 System solution 2

Note! If necessary the external components must be fused using accessory 086U9685 FUSE TO EXTERNAL COMPONENT according to the installation instructions supplied with the accessory. The tables below give the components referred to.

For system solution 2, select the following in menu SERVICE\AUX. HEATER\EXTERNAL ADDITION:

- EXT.AUX.HEATER = ON
- REV.V. HOT WATER = INT

For DHP-H, DHP-H Opti Pro, DHP-C the electrical connection for system solution 2 must be carried out according to the following table:

Table 5. Electrical connection

Component	Connection
Internal additional heater	I/O-card, output for 6 kW (normal connection)
External auxiliary heater	I/O-card, output for 3 kW, connected and fused with 086U9685
Additional shunt	Terminal block, 215/216
Internal exchange valve	I/O-card, 214 (normal connection)

For DHP-L, DHP-L Opti the electrical connection for system solution 2 must be carried out according to the following table:

Table 6. Electrical connection

Component	Connection
Internal additional heater	I/O-card, output for 6 kW (normal connection)
External auxiliary heater	Terminal block 210
Additional shunt	Terminal block, 215/216
Internal exchange valve	I/O-card, 214 (normal connection)

For DHP-A, DHP-A Opti, DHP-AL, DHP-AL Opti the electrical connection for system solution 2 must be carried out according to the following table:

Table 7. Electrical connection

Component	Connection
Internal additional heater	I/O-card, output for 3 kW and 6 kW as well as Defrost card, output for 6 kW (normal connections)
External auxiliary heater	Defrost card; 283, connected and fused with 086U9685
Additional shunt	Terminal block, 215/216
Internal exchange valve	I/O-card, 214 (normal connection)

9.6.3 System solution 3

Note! If necessary the external components must be fused using accessory 086U9685 FUSE TO EXTERNAL COMPONENT according to the installation instructions supplied with the accessory. The tables below give the components referred to.

For system solution 3, select the following in menu SERVICE\AUX. HEATER\EXTERNAL ADDITION:

- EXT.AUX.HEATER = ON
- REV.V. HOT WATER = EXT

For DHP-H, DHP-C the electrical connection for system solution 3 must be carried out according to the following table:

Table 8. Electrical connection

Component	Connection
Internal additional heater	I/O-card, output for 6 kW (normal connection)
External auxiliary heater	I/O-card, output for 3 kW, connected and fused with 086U9685
Additional shunt	Terminal block, 215/216
External exchange valve	I/O-card, 214 kW, connected and fused with 086U9685

For DHP-L, DHP-L Opti the electrical connection for system solution 3 must be carried out according to the following table:

Table 9. Electrical connection

Component	Connection
Internal additional heater	I/O-card, output for 6 kW (normal connection)
External auxiliary heater	Terminal block 210
Additional shunt	Terminal block, 215/216
External exchange valve	I/O-card, 214 kW, connected and fused with 086U9685

For DHP-A, DHP-A Opti, DHP-AL, DHP-AL Opti the electrical connection for system solution 3 must be carried out according to the following table:

Table 10. Electrical connection

Component	Connection
Internal additional heater	I/O-card, output for 3 kW and 6 kW as well as Defrost card, output for 6 kW (normal connections)
External auxiliary heater	Defrost card; 283, connected and fused with 086U9685
Additional shunt	Terminal block, 215/216
External exchange valve	I/O-card, 214 kW, connected and fused with 086U9685

For system solution 3, the heat pump's integrated exchange valve must be limited in open mode to the heating system.

To limit the direction of flow for the exchange valve for the heating system, carry out the following steps:

1. Check that the main circuit breaker is on.

2. Open the SERVICE menu by pressing and holding the left button in for five seconds.
3. Open the control computer menu SERVICE -> MANUAL TEST.
4. Set the value for MANUAL TEST to 1.
5. Set the value for REV.V. HOT WATER to 0.
6. Wait at least 15 seconds, disconnect the quick connector at the exchange valve.
7. Set the value for MANUAL TEST back to 0.
8. Connect the external exchange valve cables to the corresponding cables in the disconnected quick connector.
9. Move the supply line sensor out to the position shown in the diagram for system solution 3. See Pipe installation in chapter System solution 3.

9.7 Changing the number of auxiliary heating power stages

Caution! Setting the maximum permitted number of power stages for the auxiliary heating must be carried out.

1. Ensure that the main circuit breaker is on.
2. Open the SERVICE menu by pressing and holding in for five seconds.
3. Change the number of auxiliary heating power stages in the control system's menu SERVICE -> AUX.HEAT -> MAXSTEP, select the number of stages using **+** and **-**.

9.8 Connect outdoor unit, DHP-A, DHP-AL

Caution! The power cable may only be connected to the terminal block intended for this purpose. No other terminal blocks may be used!

1. Route the power cable through the opening in the top panel of the heat pump to the terminal blocks.
1. Connect the power cable according to the electrical instructions.

9.9 Connect defrost sensor, DHP-A, DHP-AL

The defrost sensor is installed on the outdoor unit.

1. Route the defroster sensor connection cable through the cable bushing in the top panel to the terminal block.
2. Connect the sensor according to the electrical instructions.

10 Brine installation

10.1 Heat sources

10.1.1 Bedrock heat

To use rock as the heat source one or more boreholes is/are drilled and the brine hose is lowered into it/them. The hole is filled with water and a fitting with a weight is fastened to the hose before it is lowered.

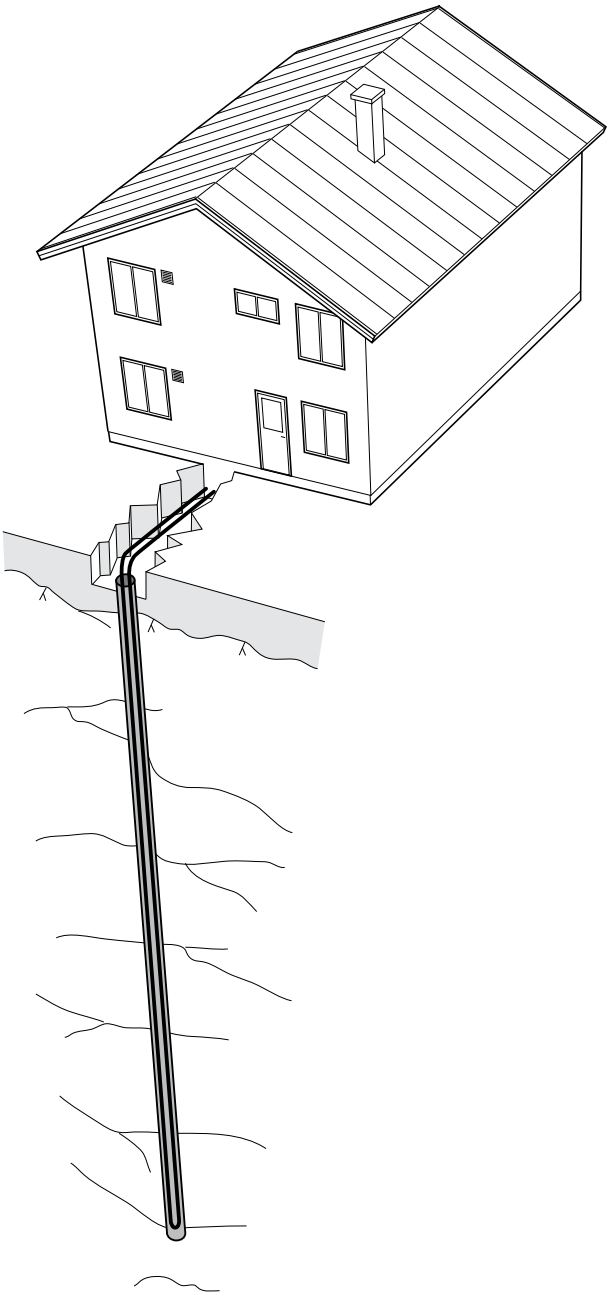


Figure 59. Rock heat as heat source

10.1.2 Lake heat

When lake water is used as the heat source one or more brine coils is/are submerged in the water . The coils must be anchored to the bottom with weights or a net to prevent them floating.

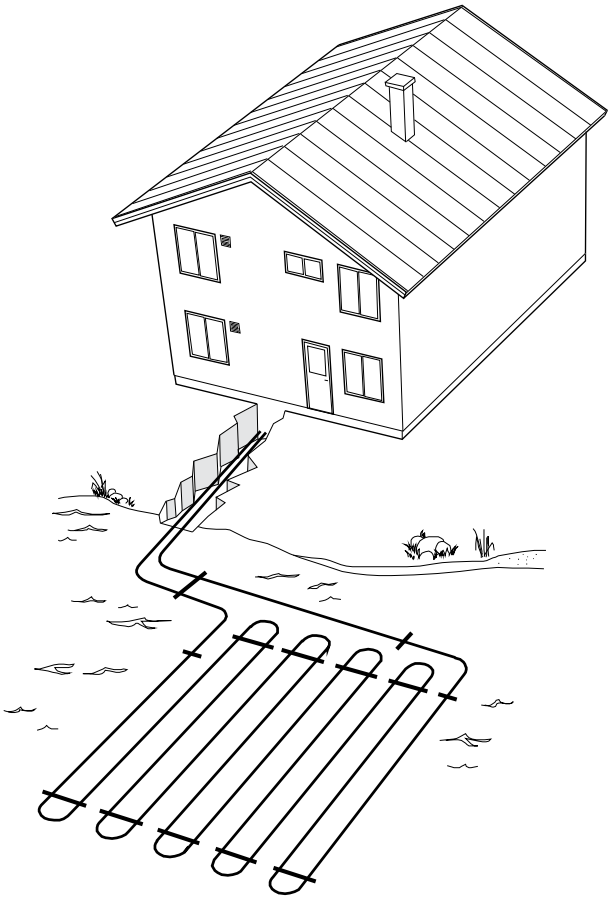


Figure 60. Lake water as heat source

10.1.3 Ground water heating

Ground water can be used as a heat source on the condition that there is a sufficiently large flow of ground water in the borehole. A submersible pump is lowered in one hole and pumps up groundwater, which flows through a separate heat exchanger, and is then returned through another borehole. The heat pump has a short brine circuit that works directly against the separate groundwater exchanger.

When ground water is used as a heat source the heat pump installation must be equipped with a flow sensor (available as an accessory) that stops the heat pump if the flow in the brine line is too low, which can create a risk of freezing in the ground water exchanger.

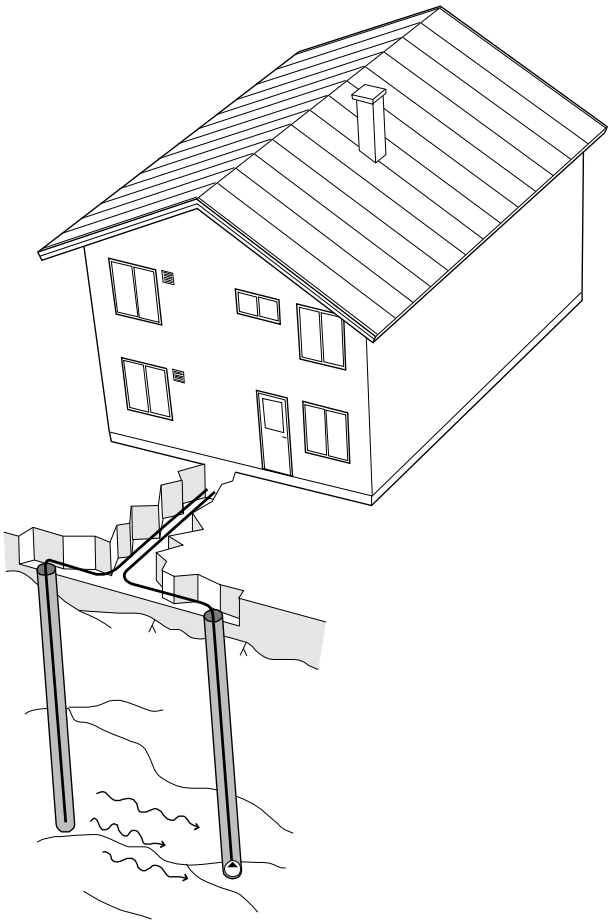


Figure 61. Ground water as heat source

10.1.4 Ground heat

The stored heat energy in the ground can be used as a heat source. In this case a brine loop (or loops) is/are laid under the surface layer of ground

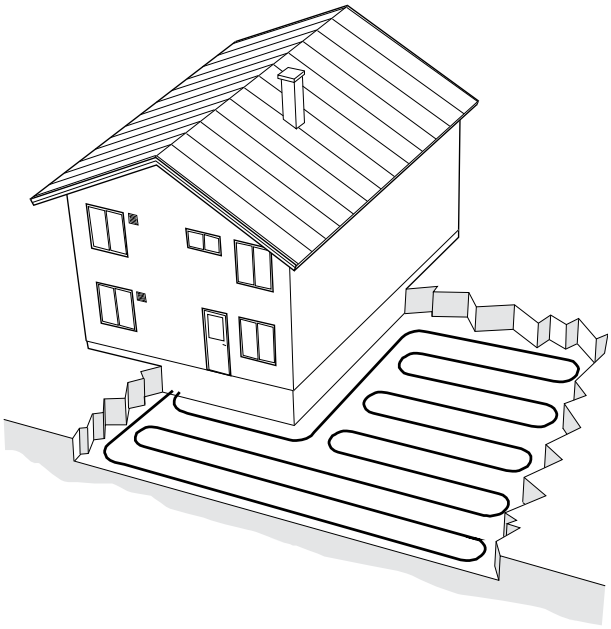


Figure 62. Ground as heat source

10.1.5 Air heat

The DHP-A andDHP-AL heat pumps are equipped with an outdoor unit that uses outdoor air as a heat source. DHP-AL can make use of the energy in the air outdoors down to temperatures of -20 degrees. To obtain the correct airflow through the outdoor section it is equipped with a fan.

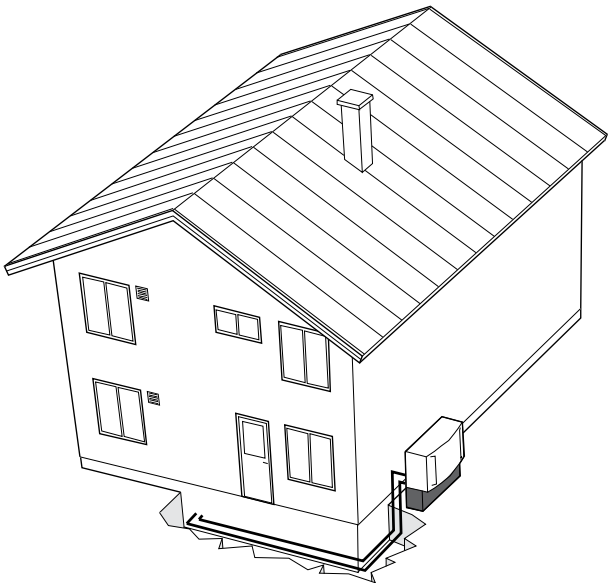


Figure 63. Connecting outdoor unit to use air as heat source

10.2 Information collector pipe

Caution! Local rules and regulations related to type of collector must be followed.

Borehole collector: Fully welded plastic pipe collector (PEM PN 6.3) according to the applicable local and national regulations with factory manufactured return bend.

Ground collector: Fully welded plastic pipe collector (PEM PN 10) according to the applicable local and national regulations.

In countries where frost damage occurs, the collector pipe beside an outer wall (minimum 2 metres) must be insulated in such a way that frost damage is prevented. This applies regardless of ground, rock or lake heat.

Minimum shaft depth between the energy well and the building is 0.5 m. If burial to that depth is not possible the pipes must be protected against any external mechanical damage.

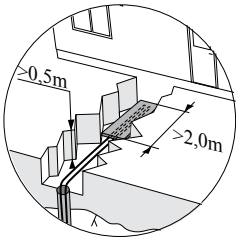


Figure 64. Shaft depth for, and insulation of, collector hoses

10.3 Connection to outdoor unit

Connection for the brine circuit from the heat pump to the outdoor unit can be carried out using pipes or hoses. Depending on what connection is selected and what diameter the connection has, there is a maximum length that the connection may be. The maximum lengths in the table below are based on ethylene glycol (which is mixed to anti-freeze protection down to -32°C) at 0°C.

Table 11. Max coil length between heat pump and outdoor unit

DHP-A, DHP-AL	**Ext.avail. press.**	**Calculated maximum coil length between the HP and outdoor unit, in metres**			
Size	kPa	Cu22 Øi = 20.0	Cu28 Øi = 25.6	PEM DN 25 Øi = 21.0	PEM DN 32 Øi = 28.0
6	30	34 (2 x 17)	133 (2 x 66.5)	48 (2 x 24)	173 (2 x 86.5)
8	63	21 (2 x 10.5)	98 (2 x 49)	30 (2 x 15)	150 (2 x 75)
10	50	11 * (2 x 5.5)	47 (2 x 23.5)	13 * (2 x 6.5)	78 (2 x 39)
12	43	5 * (2 x 2.5)	26 (2 x 13)	8 * (2 x 4)	44 (2 x 22)

*) Not recommended because of high liquid speeds with risk of corrosion/noise problems.

10.4 Connection of several brine coils

When several brine coils are used for a heat pump installation, regardless of what heat source is used, the length of the coils must not exceed the values in the following tables. The coil lengths are based on ethanol 30% at 0°C.

For hoses of type PEM DN 32, $Ø_i$ = 28.0:

Table 12. Maximum coil length, hose type PEM DN 32, Øi = 28.0

DHP-H, DHP-C, DHP-L	**Calculated maximum coil length per coil, in metres**			
Size	**1 coil**	**2 coils**	**3 coils**	**4 coils**
6	<390	<2 x 425	-	-
8	<300	<2 x 325	-	-
10	<270	<2 x 395	-	-

DHP-H, DHP-C, DHP-L	Calculated maximum coil length per coil, in metres			
12	<190	<2 x 350	-	-
16	<70	<2 x 175	<3 x 183	4 x 197

Table 13. Maximum coil length, hose type PEM DN 32, Øi = 28.0

DHP-H Opti Pro, DHP-L Opti	Calculated maximum coil length per coil, in metres			
Size	**1 coil**	**2 coils**	**3 coils**	**4 coils**
6	<390	<2 x 425	-	-
8	<320	<2 x 345	-	-
10	<250	<2 x 365	-	-
12	<170	<2 x 315	-	-
16	<80	<2 x 200	<3x 207	<4 x 225

For hose of type PEM DN 40, Øi = 35.2:

Table 14. Maximum coil length, hose type PEM DN 40, Øi = 35.2

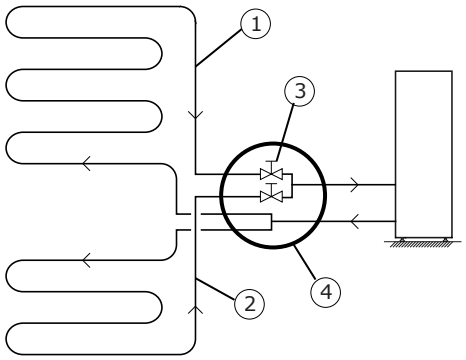
DHP H, DHP-C, DHP-L	Calculated maximum coil length per coil, in metres			
Size	**1 coil**	**2 coils**	**3 coils**	**4 coils**
6	<1000	-	-	-
8	<750	-	-	-
10	<1000	-	-	-
12	<700	<2 x 1000	-	-
16	<220*	<2 x 444*	-	

Table 15. Maximum coil length, hose type PEM DN 40, Øi = 35.2

DHP-H Opti Pro, DHP-L Opti	Calculated maximum coil length per coil, in metres			
Size	**1 coil**	**2 coils**	**3 coils**	**4 coils**
6	<1000	-	-	-
8	<780	-	-	-
10	<980	-	-	-
12	<630	<2 x 1000	-	-
16	<250*	<2 x 1000	-	-

*) When dimensioning size 16, a borehole depth that exceeds this recommendation for coil length is often required. In such cases two coils should be used.

The different brine coils are distributed from a common collection well. All return lines are led back to the well and are equipped with choke valves because the flow of each individual coil must be adjusted.



Symbol explanation

1	Brine coil 1
2	Brine coil 2
3	Choke valves
4	Collection well

Figure 65. The collection well for distributing to several brine coils

Choke valves with flow indicators (available as accessories from the Danfoss range) are used to adjust the brine flow so that it is the same in all coils.

If choke valves with flow indicators are not available adjust the valves until the temperature of all the coil return hoses is the same.

10.5 Connection diagram

10.5.1 DHP-H, DHP-H Opti Pro, DHP-L, DHP-L Opti

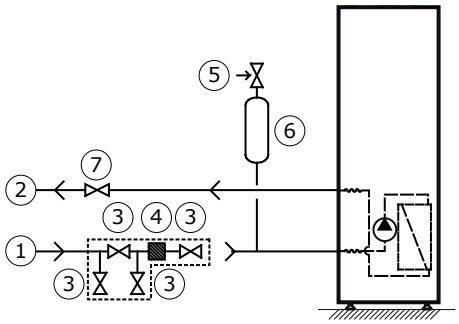


Figure 66. General connection diagram brine lines

Symbol explanation

1	Brine in
2	Brine out
3	Shut-off valve (part of the filler cock)
4	Dirt valve
5	Safety valve (1.5 bar)
6	Bleed and expansion tank
7	Shut-off valve

10.5.2 DHP-C

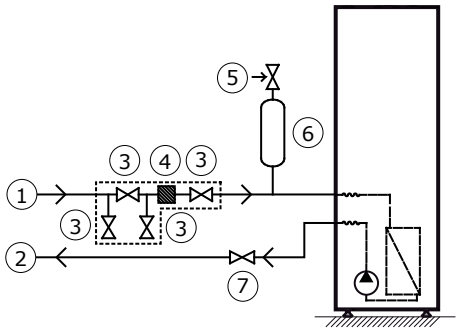


Figure 67. General connection diagram brine lines

Symbol explanation

1	Brine in
2	Brine out
3	Shut-off valve (part of the filler cock)
4	Strainer
5	Safety valve (1.5 bar)
6	Bleed and expansion tank
7	Shut-off valve

10.5.3 DHP-A, DHP-A Opti

If the outdoor unit is installed higher than the heat pump the expansion outlet must be used together with a pressure tank.

If the outdoor unit is installed at the same level or lower than the heat pump, the accompanying plastic vessel can be used. The upper part of the outdoor unit must then not exceed the fluid level in the vessel.

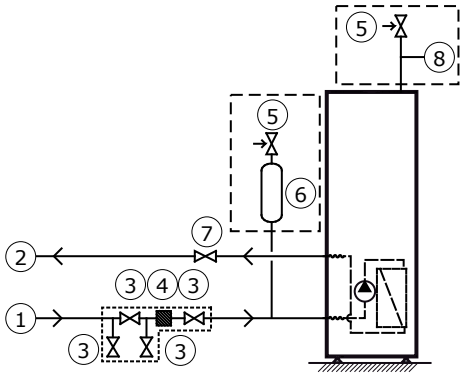


Figure 68. General connection diagram, brine lines

Symbol explanation

1	Brine in
2	Brine out
3	Shut-off valve (part of the filler cock)
4	Strainer
5	Safety valve (1.5 bar)
6	Bleed and expansion tank
7	Shut-off valve
8	Pressure tank

10.5.3.1 Outdoor unit DHP-A, DHP-AL, DHP-A Opti, DHP-AL Opti

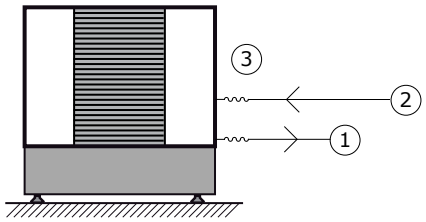


Figure 69. General connection diagram, brine lines

Symbol explanation

1	Brine out
2	Brine in
3	Flexible hoses

10.5.4 DHP-AL, DHP-AL Opti

If the outdoor unit is installed higher than the heat pump the expansion outlet must be used together with a pressure tank.

If the outdoor unit is installed at the same level or lower than the heat pump, the accompanying plastic vessel can be used. The upper part of the outdoor unit must then not exceed the fluid level in the vessel.

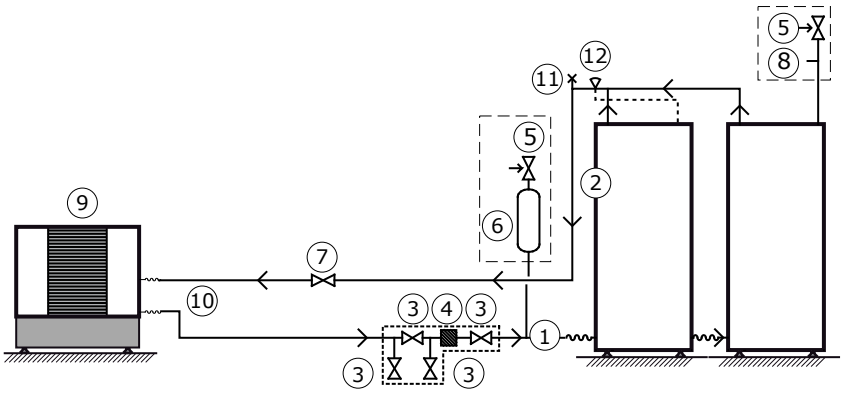


Figure 70. General connection diagram, brine lines

Symbol explanation

1	Brine in	7	Shut-off valve
2	Brine out	8	Pressure tank
3	Shut-off valve (part of the filler cock)	9	Outdoor unit
4	Strainer (part of the filler cock)	10	Flexible hoses
5	Safety valve (1.5 bar)	11	Bleed valve
6	Bleed and expansion tank	12	Moved out supply line sensor, brine

10.6 Installing brine pipes

1. Determine to which side the brine pipes are to be connected.
2. Route the out pipe for brine in through the corresponding hole (with rubber collar) in the heat pump side.
3. Install all necessary components on the pipe. Remember to install the filler cock with the filter cover upwards.
4. Route the pipe for brine out through the corresponding hole (with rubber collar) in the heat pump side.

Caution! When the brine lines are connected to the right for DHP-AAtria och Atria Optimum, the brine out line must be routed over the brine pump, under the compressor's vacuum pipe and under the condenser's flexible hose, see figure below.

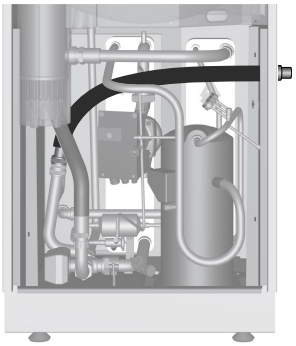


Figure 71. The brine's supply line

1. Install the out pipe with all the accompanying components.

2. Install the expansion tank with the safety valve.
3. Fit both brine pipes with anti-diffusion insulation running all the way from the heat pump to the lead-in in the wall. The brine pipes running outside the house to the collector can be buried, however they must be well insulated.

Caution! Applies from AtriamodellernaDHP-A, DHP-AL:Bear in mind that the outdoor unit may move during defrosts, use flexible hoses to connect the pipes from the heat pump and pipes on the outdoor unit.

10.7 Filling the brine system

Caution! Before filling the brine system, the electrical installation must be completed so that it is possible to operate the brine pump.

Caution! Before filling the brine system for AtriamodellernaDHP-A, DHP-AL, the water heater **MUST** be filled.

Note! Always check local rules and regulations before using anti-freeze.

Note! Anti-freeze with corrosion protection additives must be used and mixed to achieve frost protection down to -15°C for Diplomat DuoDHP-L, ComfortDHP-C and DiplomatDHP-H..

Note! Use only ethylene glycol as anti freeze for AtriaDHP-A and Atria DuoDHP-AL, mixed to achieve frost protection down to -32±1°C.

10.7.1 Calculated volume DHP-H, -C, -L

The volume of the brine system is calculated as follows:

- Heat pump (exchanger and piping) approximately 2 litres
- Expansion tank approximately 3 litres
- Collector (single pipe): PEM 40 approximately 1.0 litre/m; PEM 32 approximately 0.6 litre/m; Cu 28 approximately 0.5 litre/m

10.7.2 Calculated volume DHP-A, -AL

The volume of the brine system is calculated as follows:

- Heat pump (exchanger, pipe and outer jacket) approximately 47 litres
- Expansion tank approximately 3 litres
- Outdoor unit approximately 7 litres
- Collector (single pipe): 28 mm pipe approx. 0.5 litre/m

10.7.3 Filler cock

When the filler cock is installed on the return pipe, remember to turn the strainer cover upwards in order to minimise the amount of air that gets into the brine system when cleaning the filter.

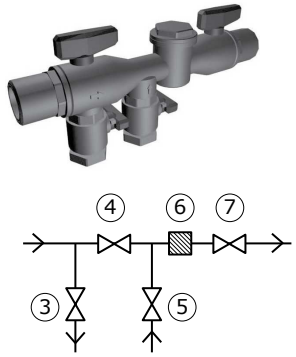


Figure 72. Filler cock

Symbol explanation

3	Shut-off valve
4	Shut-off valve
5	Shut-off valve
6	Strainer
7	Shut-off valve

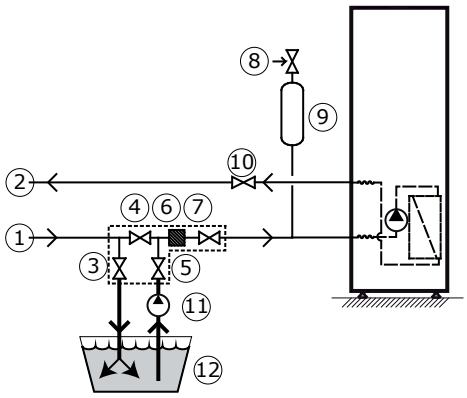


Figure 73. Filling the brine system

Symbol explanation

1	Brine in
2	Brine out
3	Shut-off valve (part of the filler cock)
4	Shut-off valve (part of the filler cock)
5	Shut-off valve (part of the filler cock)
6	Strainer (part of the filler cock)
7	Shut-off valve (part of the filler cock)
8	Safety valve 1.5 bar
9	Bleed and expansion tank
10	Shut-off valve
11	External pump
12	External container

1. Set the heat pump operating mode to "OFF" in the control computer menu INFORMATION -> OPERAT.
2. Mix water and anti-freeze in the correct proportions in an external container (12). Note that each pack must be well mixed.
3. Check that the freezing point of the mixture is reached using a refractometer (-15°C for DHP-C, DHP-L and DHP-A), (-32°C for DHP-AL, DHP-H).
4. Fill the system with the mixture using an external pump (11) which can bleed the brine pipes. Connect the pressure side of the pump to the filler connection at valve (5).
5. For DHP-A, DHP-AL: open the defroster shunt in the control computer menu SERVICE -> MANUAL TEST -> SHUNT DEFR, set the value to -.
6. Close valve (4).
7. Open valves (5) and (10).
8. Connect a transparent hose (3) that opens out into the external container (12).
9. Open valve (3).
10. Start the external pump (11) and fill the brine pipes.
11. Start the brine pump manually in the control computer menu SERVICE -> MANUAL TEST -> BRINEPUMP, set the value to 1.
12. Run the brine pump and the external pump (11) in series until fluid, clear of air, comes out of the return hose from the valve (3).

13. Stop the brine pump in the control computer menu SERVICE -> MANUAL TEST -> BRINEPUMP, set the value to 0, at the same time leave the external pump running.
14. Open valve (4) with the external pump running to eliminate the air between the valves (3) and (5).
15. Close valve (3) and pressurise the system using the external pump.

Caution! Max 150kpa (1.5 bar)

16. Close valve (5).
17. For DHP-A, DHP-AL: close the defroster shunt in the control computer menu SERVICE -> MANUAL TEST -> SHUNT DEFR, set the value to 0.
18. Stop the external pump (11) and disconnect the filling equipment.
19. Install insulation on the filler cock.

10.8 Bleeding the brine circuit

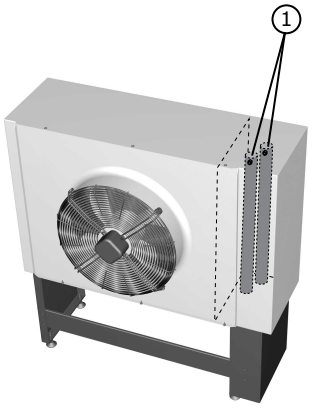
Note! When topping up, the brine pump must be running.

1. Start the brine pump in the control system's menu SERVICE -> MANUAL TEST -> BRINEPUMP, set the value to 1.
2. Check that the level in the bleed tank (9) is stabilised.
3. Dismantle the safety valve (8) on the bleed tank.
4. Top up with brine to 2/3 of the tank through the connection on which the safety valve (8) was installed.
5. Leave the brine pump running so that that the air in the system collects in the bleed tank.
6. As air separates in the bleed tank the fluid level drops, top up as in step 4.
7. Reinstall the valve (8) when all air has been removed from the system.
8. Open valve (8) and release any overpressure. The fluid level should not fall below 2/3 of the height of the tank.
9. Check that valve (3) is closed.
10. Stop the brine pump in the control system's menu SERVICE -> MANUAL TEST -> BRINEPUMP, set the value to 0.
11. Switch to the desired operating mode if the heating system has been filled and bled.

Collect any excess brine in a plastic container for topping up the system if necessary (leave it with the customer).

10.9 Vent outdoor unit

If the outdoor unit is installed higher than the heat pump with a pressurised brine system, the outdoor unit must be bled using the bleed screws (1) on the connection pipes. The side covers of the outdoor unit must be removed to access the bleed screws.



Symbol explanation

1	Bleed screws

Figure 74. Location, bleed screws

If the outdoor unit is installed at the same level or lower than the heat pump it is recommended that the brine circuit in the outdoor unit is also bled. After bleeding, the side panels and decor front panel must be installed.

11 Installing accessories/additional functions

11.1 Room sensor

The room temperature sensor has a temperature sensor that provides a further value that the control system can use when calculating the supply temperature. The impact of the room sensor in the calculation can be set in the menu HEAT CURVE -> ROOM FACTOR. Default setting for ROOM FACTOR is 2 but can be adjusted from 0 (no impact) to 4 (large impact).

The difference between the desired and actual indoor temperature is multiplied by the set value for ROOM FACTOR. The set point on the heating system's supply line increases or decreases with the result depending on whether there is a deficit or surplus of heat.

The table below shows examples of how the set point for the supply line is affected at CURVE 40 with different settings for ROOM FACTOR.

In the event of a heating deficit:

Table 16. Heating deficit

ROOM FACTOR	Desired room temperature, °C	Actual room temperature, °C	Set point for supply line, °C
0	20	18	40
1	20	18	42
2	20	18	44
3	20	18	46
4	20	18	48

In the event of a surplus of heat the conditions are the opposite:

Table 17. Heat surplus

ROOM FACTOR	Desired room temperature, °C	Actual room temperature, °C	Set point for supply line, °C
0	20	22	40
1	20	22	38
2	20	22	36
3	20	22	34
4	20	22	32

Note! The room sensor is connected to a safety extra-low voltage.

1. Install the room temperature sensor in a location in the house where the room temperature is relatively constant:
   - Centrally located in the house
   - At eye level
   - Not in direct sunlight
   - Not in a draft
   - Not in a room with alternative heating
2. Hang a thermometer next to the room temperature sensor in order to calibrate it after connecting it.
3. Connect the room sensor according to the electrical instructions.
4. After connecting the room temperature sensor, it is calibrated by holding in both buttons for 15 seconds until the display starts to flash.
5. Set the actual room temperature that the thermometer shows.

6. Wait 10 seconds until the display stops flashing.

If the display shows "--" for indoor temperature no indoor temperature has been read.

11.2 EVU function

The EVU function prevents the operation of HEATPUMP, ADD.HEAT and CIRC.PUMP as long as the contact is closed. The text EVU STOP is shown in the display when this function is active.

- Activate the EVU function according to the electrical installation instructions.

11.3 Tariff control

The room temperature lowering function provides a regular, temporary lowering of the indoor temperature.

- Activate the tariff control function according to the electrical installation instructions.
- The extent of the tariff control is set in the menu INFORMATION -> HEAT CURVE -> REDUCTION.

11.4 Flow switch/level switch

In certain countries there is a requirement that the heat pump must be equipped with a level switch for the brine system. Always check local rules and regulations before commissioning the heat pump.

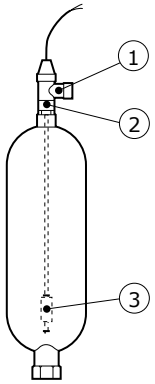


Figure 75. Level switch in the expansion tank/bleed tank

Symbol explanation

1	Safety valve
2	Level switch
3	Floats

- Connect the flow sensor according to the installation instructions supplied with the accessory .

11.5 Higher hot water temperature

Caution! Does not apply to heat pumps with refrigerant R134a, models ComfortDHP-C, -4H, -5H och -7H.

Caution! Never connect the heat pump to provide a higher temperature unless the heating or hot water systems require it. Higher temperatures increase the load on the heat pump.

If necessary, the heat pump can be connected to produce hotter water for the heating system and hot water system when it is installed.

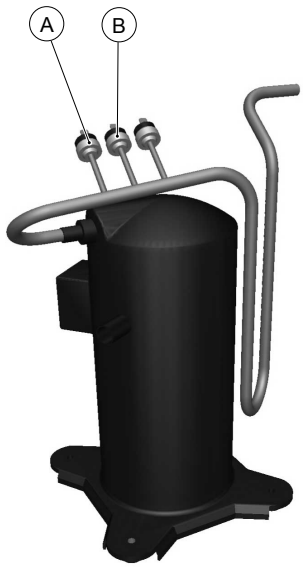


Figure 76. The pressure switches on the compressor's pressure pipe

1. Move the grey cables, which are normally connected to pressure switch A, to pressure switch B.

12 Menu information

Menu description regards software with version 1.3.
The heat pump has an integrated control system which automatically calculates the heat demand in the house to ensure that the correct amount of heat is produced and emitted where necessary. There are many different values (parameters), which are required in order to do the calculation of the heat demand.

During installation and service, the control panel is used to set and change values that have to be adapted according to the house demand. The control panel consists of a display, a keypad and an indicator. In the display, a simple menu system is used to navigate the desired settings and values. During operation, the display always shows the set ROOM value, the operating mode and the status of the heat pump.

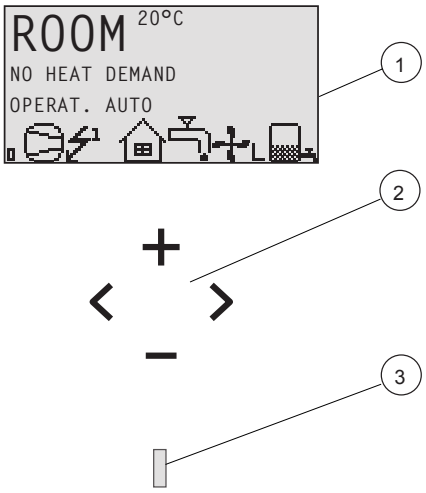


Figure 77. Display, keypad and indicator.

Position	Description
1	The display text and symbols are only shown as examples. Certain symbols cannot be displayed at the same time.
2	Keypad: + Plus sign used to scroll up a menu or increase the values. - Minus sign used to scroll down a menu or reduce the values. > Right arrow used to select a value or open a menu. < Left arrow to cancel selection or exit a menu.
3	Indicator

The control system is operated via a user-friendly menu system, which is shown in the display. Use the keypad's four navigation symbols to navigate the menus and increase or reduce the set values.

The control system is divided into the following two main menus:

- INFORMATION
- SERVICE

The INFORMATION menu is used to adjust the following (also see INFORMATION menu:

- Operation
- Heat curves
- Temperatures
- Operating time
- Menu system language

The SERVICE menu is used during installation and services with many settings, see *Installation instructions.*

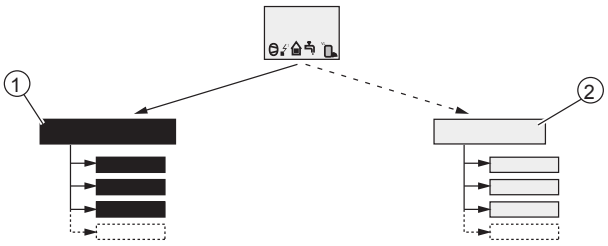


Figure 78. The menus are reached by pressing different buttons.

Position	Description
1	Information menu Press the left or right buttons.
2	Service menu Press and hold the left button for at least five seconds

The INFORMATION menu is opened by pressing the left or right buttons.

For installation and service, the SERVICE menu is used, which is opened by pressing the left button for five seconds.

The indicator at the bottom of the control panel has three modes:

- Not lit, means that the heat pump is not powered.
- When the light shines continuously, the heat pump has power and is ready to produce heat or hot water.
- Flashing, means an active alarm

Caution! During a service that consists of replacing the display card, all heat pump settings are reset to factory settings. Therefore note current settings before replacement.

---

13 INFORMATION menu

Open the menu by pressing the left or right button. The menu also shows history and operating times.

Note! The menu information below describes all possible parameters. The parameters that appear in the display vary depending on the selections made in menus (e.g. type of heat pump) and on the connected hardware (e.g. expansion card and defrost card).

Table 18. Used to change the heat pump's operating modes and to adjust the heat curve.

Menu	Sub menu	Sub menu	Sub menu
INFORMATION			
	OPERAT.		
		?	**CANCEL** **Ø**
		AUTO **HEAT PUMP** **AUX. HEATER** **HOT WATER** **MANUAL TEST**	
	HEAT CURVE		
		CURVE **MIN** **MAX** **CURVE 5** **CURVE 0** **CURVE -5** **HEAT STOP** **REDUCTION** **TANK TEMP** **OVERCHARGE** **ROOM FACTOR** **POOL** **POOL HYSTERESIS**	
	HEAT CURVE 2 (if shunt group is activated)		
		CURVE **MIN** **MAX**	
	TEMPERATURE		
		OUTDOOR **ROOM** **SYSTEM SUPPLY** **SUPPLY LINE** **RETURN LINE** **BUFFER TANK** **HOT WATER** **INTEGRAL** **BRINE IN** **BRINE OUT** **POOL** **COOLING** **SHUNT GROUP** **2ND HEAT CIR.** **CURRENT**	
	OPERAT. TIME		

Menu	Sub menu	Sub menu	Sub menu
		HEAT PUMP **AUX. HEAT 1** **AUX. HEAT 2** **AUX. HEAT 3** **HOT WATER** **COOLING** **ACT COOLING**	
	DEFROST		
		DEFROSTS **BETW. 2 DEFR** **TIME LAST DEFR** **FAN H OFF AT** **DEFROST CURVE** **MANUAL DEFR**	
	LANGUAGE		
		SVENSKA **ENGLISH** **DEUTSCH** **NEDERLANDS** **FRAN?S** **ESPA?L** **ITALIANO** **NORSK** **DANSK** **SUOMI** **EESTI** **POLSKI** **ČEŠTINA**	

13.1 Sub-menu OPERAT.

Table 19. Used to select operating mode.

Menu selection	Meaning	Factory setting
⏻ **(OFF)**	The installation is fully switched off. This mode is also used to acknowledge certain alarms. CANCEL = starting point, no changes made. To select OFF as operating mode, press the minus sign once to scroll down one step and press the right arrow once.	-
AUTO	Automatic operation with both heat pump and auxiliary heater permitted. If the number of power stages for auxiliary heating are set to zero (SERVICE -> AUX. HEATER -> MAX STEP) only AUTO or OFF can be selected as operating mode.	-
HEAT PUMP	Operation with only heat pump permitted. Note! No peak heating charging (anti-legionella function) with only heat pump operation.	-
AUX. HEATER	Operation with only auxiliary heater permitted.	-
HOT WATER	Operation with heat pump for hot water production and auxiliary heater during peak heating charging (anti-legionella function).	-
MANUAL TEST	Only displayed when the value for MANUAL TEST is set to 2 in The SERVICE menu. Outputs that control components are activated manually.	-

13.2 Sub-menu HEAT CURVE

Table 20. Used to change settings for the heat curve.

Menu selection	Meaning	Factory setting
CURVE	Calculated supply temperature at 0°C outdoor temperature. Shown as a graphic curve. The curve will be limited by the set values of MIN and MAX.	40°C (for under floor heating 30°C) (range: 22°C / 56°C)
MIN	Minimum permitted supply temperature, if the temperature for heat stop has been reached and the heat pump has stopped.	10°C (range: 10°C / 50°C)
MAX	Maximum calculated setpoint value of the supply temperature.	55°C (for under floor heating 45°C) (range: 40°C / 85°C)
CURVE +5	Local increase or reduction of CURVE at an outdoor temperature of +5°C. Shown in the graph for CURVE.	0 (range: -5°C / 5°C)
CURVE 0	Local increase or reduction of CURVE at an outdoor temperature of 0°C. Shown in the graph for CURVE.	0°C (range: -5°C / 5°C)
CURVE -5	Local increase or reduction of CURVE at an outdoor temperature of -5°C. Shown in the graph for CURVE.	0 (range: -5°C / 5°C)
HEAT STOP	Maximum outdoor temperature when heat production is permitted. If HEAT STOP applies, the outdoor temperature must drop 3°C below the setting before HEAT STOP stops.	17°C (range: 0°C / 40°C)
REDUCTION	Only appears if the tariff control function has been activated. Lowering set room temperature. Active at 10 kΩ connection at EVU input.	2°C (range: 1°C / 10°C)
TANK TEMP	Displayed if buffer tank is active. Charges the buffer tank to the set temperature. AUTO setting charges the tank to the supply line setpoint value.	AUTO (range: 30°C / 55°C)
OVERCHARGE	Displayed if the buffer tank is active and TANK TEMP is set to AUTO. Charges the buffer tank to supply line setpoint value + the value of OVERCHARGE.	0 (range: 0 / 5)
ROOM FACTOR	Only displayed if an accessory Room temperature sensor is installed. Determines how great an impact the room temperature is to have when calculating the supply temperature. For under floor heating it is recommended that ROOM FACTOR is set to 1, 2 or 3. For radiator heating it is recommended that ROOM FACTOR is set to 2, 3 or 4.	2 (range: 0 / 4) (0 = no impact, 4 = very large impact)
POOL	Only appears if POOL is selected. The temperature in the pool is controlled by a separate sensor regardless of the heating and hot water system.	20°C (range: 5°C /40°C)
POOL HYSTERESIS	Only appears if POOL is selected. The difference between the desired charge value (adjustable) and actual value to the pool sensor. Pool hysteresis does not affect the integral value.	2°C (range: 1°C / 10°C)

13.3 Sub-menu HEAT CURVE 2

Only appears if shunt group sensor is connected and activated in menu SERVICE -> INSTALLATION -> SYSTEM -> SHUNT GROUP.

Table 21. Used to change settings for heat curve 2.

Menu selection	Meaning	Factory setting
CURVE 2	Calculated shunt group temperature at 0°C outdoor temperature. Shown as a graphic curve. The curve will be limited by the set values of MIN and MAX.	40°C (range: 22°C / 56°C)
MIN	Minimum permitted shunt group temperature, if the temperature for heat stop has not been reached.	10°C (range: 10°C / 50°C)
MAX	Maximum permitted shunt group temperature.	55°C (range: 15°C / 70°C)

13.4 Sub-menu TEMPERATURE

The history of different temperature measurements can be viewed by pressing the right arrow key. The graph shows the last 60 measurement points for the set time interval (SERVICE -> INSTALLATION -> LOG TIME). In the event of an alarm, history stops being logged until the alarm is reset by changing the operating mode to OFF.

Table 22. Used to indicate the prevailing temperatures, history and set/calculated values.

Menu selection	Meaning	Factory setting
OUTDOOR	Shows the actual outdoor temperature.	-
ROOM	Shows the actual set temperature.	-
SYSTEM SUPPLY	Displays system supply temperature at the buffer tank system.	-
SUPPLY LINE	Shows the actual supply temperature. The calculated supply temperature to the heating system group is within brackets. During hot water production in operating mode AUX. HEATER the value for HOT WATER STOP + 10° is shown within brackets.	-
RETURN LINE	Shows the actual return temperature. The stop temperature, MAX RETURN is within brackets.	-
BUFFER TANK	Indicates the buffer tank temperature, if activated.	-
HOT WATER	Indicates actual hot water temperature, if activated.	-
INTEGRAL	Shows the actual calculated value for integral.	-
BRINE IN	Shows the actual temperature for brine in.	-
BRINE OUT	Shows the actual temperature for brine out.	-
POOL	Only appears if POOL is selected. Shows the actual pool temperature. The set pool temperature is shown in brackets.	-
COOLING	Indicates temperature.	
SHUNT GROUP	Only appears if SHUNT GROUP is selected. Shows the actual supply temperature. The calculated supply temperature to the shunt group is within brackets.	-
2ND HEAT CIR.	Shows the temperature of the second heating circuit if installed by the buffer tank system.	
CURRENT	Only appears if CURRENT LIMITER is selected. Shows the actual current consumption. The set value for MAX CURRENT is shown in brackets.	-

13.5 Sub-menu OPERAT.TIME

Table 23. Used to show the operating time for each component. Time given in hours.

Menu selection	Meaning	Factory setting
HEAT PUMP	Compressor operating time for both heating and hot water production.	-
AUX. HEATER	Operating time of auxiliary heater.	-
HOT WATER	Operating time for hot water with compressor.	-

13.6 Sub-menu DEFROST

Table 24. Used to obtain information about defrosting settings and to make defrosting settings.

Menu selection	Meaning	Factory setting
DEFROSTS	Total number of defrosts carried out.	-
BETW. 2 DEFR	The operating time of the compressor in minutes between the two last defrosts.	-
TIME LAST DEFR	The operating time of the compressor in minutes since last defrost.	-
FAN H OFF AT	High speed is deactivated at this temperature and low speed is activated.	12°C (range: 10°C / 20°C)

Menu selection	Meaning	Factory setting
DEFROST CURVE	Used to change the angle of the defrost curve using + or– (Change the start temperature for defrost).	-10°C (range: -13°C / -7°C)
MANUAL DEFR	Used to perform a manual defrost. Started using + or -.	0 (range: 0 / 1)

13.7 Sub-menu LANGUAGE

Table 25. Used to set the language of the menu system.

Menu selection
SVENSKA
ENGLISH
DEUTSCH
NEDERLANDS
FRANÇAIS
ESPAÑOL
ITALIANO
NORSK
DANSK
SUOMI
EESTI
POLSKI
ČEŠTINA

14 SERVICE menu

The SERVICE menu is for use during installation and service to optimise and adjust the operation of the heat pump. Open the menu by pressing the left button for five seconds.

Note! The menu information below describes all possible parameters. The parameters that appear in the display vary depending on the selections made in menus (e.g. type of heat pump) and on the connected hardware (e.g. expansion card and defrost card).

Table 26. Used to change the heat pump's default settings.

Menu	Sub menu	Settings/Sub menu	Settings	
SERVICE				
	HOT WATER			
		START **HOT WATER TIME** **HEATING TIME** **TOPH. INTERVAL** **TOPH. TIME** **TOPH.STOP** **INFL. H.W SENSOR** **WEIGHT HOT WATER**		
	HEAT PUMP			
		INTEGRAL A1 **HYSTERESIS** **MAX RETURN** **START INTERVAL** **ALARM BRINE** **PRESS. PIPE** **OUTDOOR STOP** **SHUNT TIME** **SHUNT COOLING**		
	AUX. HEATER			
		MAX STEP **INTEGRAL A2** **HYSTERESIS** **MAX STEP** **MAX CURRENT** **HOT WATER STOP** **DELAY AFTER EVU**		
		EXT.AUX.HEATER		
			EXT.AUX.HEATER **INTEGRAL A3** **TURN OFF DELAY** **REV.V. HOT WATER** **TOPH. AUX**	

Menu	Sub menu	Settings/Sub menu	Settings	
	MANUAL TEST			
		MANUAL TEST **HEAT PUMP** **BRINE PUMP** **CIRC. PUMP** **REV.V. HOT WATER** **SHUNT** **SYSTEM SHUNT** **HGW-SHUNT** **AUX. HEAT 1** **AUX. HEAT 2** **AUX. HEAT 3** **EXT.AUX.HEATER** **EXT. CIRC. PUMP** **SHUNT DEFR** **FAN L** **FAN H** **EXT. AUX. HEATER** **ALARM** **SHUNT COOLING** **SHUNT GROUP** **VK 2 SHUNT** **PASSIVE COOLING** **COOLING A** **REV. V. POOL** **0-10V**		

Table 27. Used to change the heat pump's default settings. (continued)

Menu	Sub menu	Sub menu	Sub menu	Sub menu
SERVICE				
	INSTALLATION			
		SYSTEM		
			HEAT SOURCE	
				GROUND OR ROCK
				OUTSIDE AIR (BRINE SOLUTION DIRECT EVAP.)
			COOLING	
				PASSIVE COOLING (Ø EXTERNAL INTEGRATED IN HP)
				COOLING A (Ø EXTERNAL)
				ROOM SENSOR
			POOL **SHUNT GROUP**	
			BUFFER TANK	
				BUFFER TANK **SYSTEM SHUNT** **2ND H.C SHUNT**
			ADDITION	
				OPTIMUM
				HGW

Menu	Sub menu	Sub menu	Sub menu	Sub menu
				0-10V (Ø EXT. AUX. HEATER)
				FLOW SENSOR
				CURRENT LIMITER
				PHASE FAULT (Ø PHASE READING)
		SERVICE TIME		
		FACTORY SET		
			CANCEL **RADIATOR** **FLOOR**	
		RESET OPER. TIME		
		SENSOR CALIBRATION		
			OUTDOOR **SUPPLY LINE** **RETURN LINE** **HOT WATER** **BRINE IN** **BRINE OUT** **DEFR SENSOR** **POOL** **SHUNT GROUP** **HGW TEMPERATURE** **BUFFER TANK** **2ND HEAT CIR.** **SYSTEM SUPPLY** **EXTERNAL FACTOR**	
		VERSION		
			DISPLAY **I/O-CARD**	
		LOG TIME		
		BRINE TIME ON		
		BRINE TIME OFF		
	DEFROST			
		DEFR CURVE 0 **DEFR CURVE -XX** **DEFR TEMPERATURE** **STOP DEFR** **BELOW 5°C DEFR** **MIN TIME DEFR** **FAN START** **FAN STOP** **DEFR SENSOR**		
	OPTIMUM			
		TEMP DIFF CIRC. **TEMP DIFF BRINE** **START FLOW CIRC.** **START FLOW BRINE** **CONST. FL. CIRC:** **CONST. FL. BRINE** **MIN FLOW CIRC.** **MAX H.W CHARGE HW** **MIN CHARGE. HW**		

Menu	Sub menu	Sub menu	Sub menu	Sub menu
	HGW			
		HGW TEMPERATURE **TEMPERATURE DIFF** **HOT WATER DIFF** **HOT WATER TO RAD** **MAX TEMPERATURE** **START HGW** **INITIALIZING HGW** **INTEGRAL DELAY** **HGW-SHUNT TIME** **HGW INT. BOUND.** **HGW INTEGRAL** **PULSE WIDTH**		

14.1 Sub-menu HOT WATER

Table 28. Used to change the settings for hot water production.

Menu selection	Meaning	Factory setting
START	Start temperature for hot water production. Shows the actual weighted hot water temperature and the value within brackets indicates the start temperature. (⏻ = no hot water production)	⏻ (range: ⏻, 30°C / 55°C)
HOT WATER TIME	Time for hot water production during combined hot water and heating demand, in minutes.	20M (range: 5M / 40M)
TOPH. TIME	Time in hours that the legionella demand is to be fulfilled for legionella operation to be considered complete.	0M (range: 1M / 10M
HEATING TIME	Time for hot water production during combined heating and hot water demand, in minutes.	20M (range: 5M / 40M)
TOPH. INTERVAL	Time interval between peak heating chargings (anti-legionella function) in days. Operating mode that permits auxiliary heater must be selected.	7D (range: ⏻, 1D / 90D)
TOPH. STOP	Stop temperature for peak heat charging. Operating mode that permits auxiliary heater must be selected.	60°C (range: 50°C / 65°C)
INFL. H.W SENSOR.	Water heater sensor's influence compared with the peak sensor's at start of water heating.	65% (range: 0% / 100%)
WEIGHT HOT WATER	The calculated value of the hot water sensor directed towards the peak sensor.	-

14.2 Sub-menu HEAT PUMP

Table 29. Used to change the heat pump's operating settings.

Menu selection	Meaning	Factory setting
INTEGRAL A1	The integral's value for starting the heat pump. See Important parameters for more information.	-60°min (range: -250°min / -5°min)
HYSTERESIS	If the difference between the actual supply temperature and the calculated supply temperature is too great either the integral value is set to start value A1 (the heat pump starts) or the value is set to 0 (stops the heat pump).	10°C (range: 1°C / 15°C)
MAX RETURN	Stop temperature at high return from the heating system.	55°C (range: 30°C / 70°C)

Menu selection	Meaning	Factory setting
START INTERVAL	Minimum time interval between two heat pump starts in minutes.	20M (range: 10M / 30M)
ALARM BRINE	Gives an alarm when the outgoing brine temperature falls below the set value.	⏻ (range: ⏻, -14°C / 10°C)
PRESS. PIPE	Sensor on the compressor's hot gas line. The value within brackets indicates maximum permitted temperature. If this value is exceeded, the compressor will stop and start again as soon as the temperature has dropped. No alarm shown in the display, however, a square is shown in the left, lower corner of the display.	140°C
OUTDOOR STOP	Displayed only if AIR is selected. Lowest outdoor temperature when the outdoor sensor stops the compressor and heating or hot water are instead produced by the auxiliary heater.	-20°C (range: -20°C / -1°C)
SHUNT TIME	Time in seconds. Indicates how often the shunt is to adjust its opening.	60S (range: 10S / 99S
SHUNT COOLING	The cooling shunt works towards the set temperature.	18°C (range: 0°C / 30°C)

14.3 Sub-menu AUX. HEATER

Table 30. Used to change the heat pump stages' operating settings.

Menu selection	Meaning		Factory setting
MAX STEP	Maximum number of permitted steps for auxiliary heating. ⏻ = no auxiliary heating permitted (Means that only AUTO or HEAT PUMP can be selected.)		⏻ (range: ⏻, 1, 2, 3, 4, 5, +4, +5)
INTEGRAL A2	Two conditions must be fulfilled in order to start the auxiliary heater: the integral's value to start must be less than integral A2, and the supply temperature must be 2°C lower than the calculated temperature. See Important parametersfor more information.		-600 (range: -50 / -990)
HYSTERESIS	If the difference between the actual supply temperature and the calculated supply temperature is too great (see Important parameters), either the integral value is set to start value A2 (starts the auxiliary heater) or to 0 (stops the auxiliary heater).		20°C (range: 5°C / 30°C)
MAX CURRENT	Refers to main fuse in the unit, in amperes		20 (range: 16 / 35)
HOT WATER STOP	Stop temperature for hot water during AUX. HEATER. The value is read off by the hot water sensor.		60°C (range: 50°C / 65°C)
DELAY AFTER EVU	Time in minutes. Indicates how many minutes after EVU are to pass before the auxiliary heater may be activated.		30M (range: 0M / 120M)
EXT.AUX.HEATER			
	Menu selection	Meaning	
	EXT.AUX.HEATER	Indicates whether an external auxiliary heater is installed in the system.	⏻ / ON
	INTEGRAL A3	Indicates the value of the integral when external auxiliary heater is connected.	-300 (range: -990 / INTEGRAL A1 - 10)
	TURN OFF DELAY	Indicates how long the external auxiliary heater must continue to be active after its demand is no longer needed.	0M (range: 0M / 180M)

Menu selection	Meaning		Factory setting
	REV.V. HOT WATER	Indicates whether the exchange valve for hot water is located before or after the external auxiliary heater. (Determines whether the external auxiliary heater may produce hot water.)	INT / EXT
	TOPH. AUX	Indicates whether the external auxiliary heater can be used for anti-legionella. The exchange valve must be positioned after the external auxiliary heater.	⏻ / ON

14.4 Sub-menu MANUAL TEST

Table 31. Used to manually test and test operate the heat pump's components or signal outputs.

Menu selection	Meaning		Factory setting
MANUAL TEST	0 = deactivate manual test 1 = activate manual test 2 = activate manual test with option of navigating from the SERVICE menu to check that the temperatures rise for example.		-
HEAT PUMP	0 = stop heat pump 1 = start heat pump Note! The heat pump cannot be started in the event of an active alarm.		-
BRINE PUMP	0 = stop the brine pump 1 = start the brine pump		-
CIRC. PUMP	0 = stop the circulation pump 1 = start the circulation pump		-
REV.V. HOT WATER	0 = heating mode for the exchange valve 1 = hot water mode for the exchange valve		-
SHUNT	- = closes shunt 0 = shunt unaffected + = opens shunt		
SYSTEM SHUNT	- = closes shunt 0 = shunt unaffected + = opens shunt	Only at buffer tank	
HGW-SHUNT	- = closes shunt 0 = shunt unaffected + = opens shunt		
AUX. HEAT 1	0 = stop aux. heater step 1 1 = start aux. heater step 1		-
AUX. HEAT 2	0 = stop aux. heater step 2 1 = start aux. heater step 2		
AUX. HEAT 3	0 = stop aux. heater step 3 1 = start aux. heater step 3		
EXT.AUX.HEATER	0 = stop external auxiliary heater 1 = start external auxiliary heater		
EXT.CIRC. PUMP	0 = stop circulation pump 1 = start circulation pump		

Menu selection	Meaning		Factory setting
SHUNT DEFR	- = opens flow from defrosting tank 0 = shunt unaffected + = closes flow from defrosting tank		
FAN L	0 = stop fan 1 = start fan at low speed		
FAN H	0 = stop fan 1 = start fan at high speed		
EXT. AUX. HEATER	0 = 0V on plinth 283 1 = control voltage 230V on plinth 283		
ALARM	0 = stop signal on output External alarm 1 = start signal on output External alarm		-
SHUNT COOLING	- = closes shunt 0 = shunt unaffected + = opens shunt		-
SHUNT GROUP	- = closes shunt 0 = shunt unaffected + = opens shunt		
2ND H.C SHUNT	- = closes shunt 0 = shunt unaffected + = opens shunt	Only at buffer tank	
PASSIVE COOLING	0= stop passive cooling 1= start passive cooling		
COOLING A	0= stop active cooling 1= start active cooling		
REV. V. POOL	0 = normal mode for the exchange valve 1 = pool mode for the exchange valve		-
0-10V	Used for circulation pumps at BUFFER TANK.		-

14.5 Sub-menu INSTALLATION

Table 32. Used for settings that are set during installation.

<table>
<tr><th>Menu selection</th><th>Meaning</th><th>Factory setting</th></tr>
<tr><td>SYSTEM</td><td colspan="2">Sub menu SERVICE -> INSTALLATION -> SYSTEM:

Note! The menu selection in the SYSTEM menu varies depending on the selected values. Tip: start in the top menu and work downwards.

<table>
<tr><th>Menu selection</th><th>Meaning</th></tr>
<tr><td>HEAT SOURCE</td><td>GROUND OR ROCK
OUTSIDE AIR
(BRINE SOLUTION, DIRECT EVAP.)</td></tr>
<tr><td>COOLING</td><td>PASSIVE COOLING
(⏻, EXTERNAL, INTEGRATED IN HP)
COOLING A
(⏻, EXTERNAL)
ROOM SENSOR
(⏻, ON)</td></tr>
<tr><td>POOL</td><td>⏻, ON</td></tr>
<tr><td>SHUNT GROUP</td><td>⏻, ON</td></tr>
<tr><td>BUFFER TANK (See separate instruction for buffer tank)</td><td>BUFFER TANK
SYSTEM SHUNT
2ND H.C SHUNT</td></tr>
<tr><td>ADDITION</td><td>OPTIMUM
(⏻, ON)
HGW
(⏻, ON)
0-10V
(⏻, EXT. AUX. HEATER)
FLOW SENSOR
(⏻, ON)
CURRENT LIMITER
(⏻, ON)
PHASE FAULT
(⏻, PHASE READING)</td></tr>
</table>
</td></tr>
<tr><td>SERVICE TIME</td><td>Note! Only used for test operation. The heat pump counts 60 times as fast, which means that the waiting times are eliminated during test operation.

0 = deactivates SERVICE TIME
1 = activates SERVICE TIME, which speeds up the control system's integral calculation and start delay by 60 times.</td><td>-</td></tr>
</table>

Menu selection	Meaning	Factory setting
FACTORY SET	CANCEL = starting point, no changes made. RADIATOR = reset factory settings for radiator system FLOOR = reset factory settings for under floor heating	-
RESET OPER. TIME	0 = no reset of operating times 1 = reset of operating times to zero	-
SENSOR CALI-BRATION	Following sensors can be found in the installation: OUTDOOR SUPPLY LINE RETURN LINE HOT WATER BRINE IN BRINE OUT DEFR SENSOR POOL SHUNT GROUP HGW TEMPERATURE BUFFER TANK 2ND HEAT CIR. SYSTEM SUPPLY EXTERNAL FACTOR Affects sensors that are installed inside the heat pump.	 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0, (range: -5°C / 5°C) 0 (5°C for DHP-A, DHP-A Opti, DHP-AL, DHP-AL Opti) (range: 0°C / 20°C)
VERSION	Shows the software version which is stored on the display card respectively the I/O-card. DISPLAY: V X.X I/O-CARD: V X.X	-
LOG TIME	Time interval between collection points of temperature history in minutes. The history graphs always show the 60 last collection points, which means that the graphs can display history from 1 hour up to 60 hours ago. (The function is not active if there is an active alarm).	1M (range: 1M / 60M)
BRINE TIME ON	The brine pump starts the set number of seconds before the compressor. Applies at start of heat pump.	30S (range: 10S / 90S)
BRINE TIME OFF	The brine pump stops the set number of seconds after the compressor. Applies at stop of heat pump.	30S (range: 10S / 60S)

14.6 Sub-menu DEFROST

The menu applies to DHP-A, DHP-AL with defrost card and only appears if OUTDOOR AIR in SERVICE -> INSTALLATION -> SYSTEM -> HEAT SOURCE menu is selected.

Table 33. Used to change settings for outdoor unit defrost.

Menu selection	Meaning	Factory setting
DEFR CURVE 0	Used to set the temperature of the heat pump's brine return at which defrosting should start, at 0°C outdoor temperature, using + or -. The graph can be changed up or down at 0°C outdoor temperature in the display. See Important parameters for more information.	-10°C (range: -15°C / -5°C)
DEFR CURVE -xx	Used to set the temperature at which the heat pump's brine return is to start a defrost, at the set outdoor temperature for OUTDOOR STOP, using +or-. The setting is made by reducing the OUTDOOR STOP value by this value. The number of degrees shown after DEFR CURVE in the display is the set value for OUTDOOR STOP. The combined temperature is shown in the top right corner of the display. The graph can be changed up or down at the outdoor temperature OUTDOOR STOP in the display. See Important parameters for more information.	OUTDOOR STOP reduced by 4°C (range: - 8°C / - 1°C)

Menu selection	Meaning	Factory setting
DEFR TEMPERA-TURE	The temperature shunted to the outdoor unit during a defrost.	15°C (range: 13°C / 25°C)
STOP DEFR	The temperature that the Brine In sensor must reach to complete a defrost.	11°C (range: 7°C / 12°C)
BELOW 5°C DEFR	Safety defrosting occurs when the outdoor temperature has been below 5°C for a set number of days, shunts +20°C for 10 minutes.	7D (range: ⏻, 1D / 14D)
MIN TIME DEFR	Minimum time between two defrosts in minutes.	45M (range: 10M / 60M)
FAN START	The fan starts when the temperature on the brine in sensor to the heat pump reaches the set value. If FAN START is set to ON, the fans starts and stops at the same time as the compressor and the FAN STOP parameter is inactive.	-2°C (range: ON, -5°C / FAN STOP-3°C)
FAN STOP	The fan stops when the temperature on the brine in sensor to the heat pump reaches the set value.	17°C (range: FAN START +3°C / 30°C)
DEFR SENSOR	Shows the actual temperature of the incoming air to the outdoor unit.	

14.7 Sub menu OPTIMUM

The menu applies to Opti with speed controlled circulation pumps and only appears if ON in SERVICE -> INSTALLATION -> SYSTEM -> ADDITION -> OPTIMUM menu is selected.

Table 34. Used to change the circulations pumps' operating settings.

Menu selection	Meaning	Factory setting
TEMP DIFF CIRC.	Desired temperature difference between supply and return line for the heating system.	8°C (range: ⏻, 0°C / 15°C)
TEMP DIFF BRINE	Desired temperature difference between supply and return line for the brine system.	3°C (range: ⏻, 0°C / 15°C)
START FLOW CIRC.	Speed control of the heating system's circulation pump in Volts. Higher voltage gives a greater circulation pump speed, which gives a lower temperature difference. A low voltage gives a greater difference. 3 - 10 = Manually adjustable speed, where 3 is low voltage and 10 is high voltage.	7V (range: 3V / 10V)
START FLOW BRINE	Speed control of the brine system's circulation pump in Volts. Higher voltage gives a greater brine pump speed, which gives a lower temperature difference. A low voltage gives a greater difference. 3 - 10 = Manually adjustable speed, where 3 is low voltage and 10 is high voltage.	10V (range: 3V / 10V)
CONST. FL. CIRC.	If TEMP DIFF CIRC is set to ⏻ the flow is continuous with this value in the heating system. Value indicated in Volts.	7V (range: 3V / 10V)
CONST. FL. BRINE	If TEMP DIFF BRINE is set to ⏻ the flow is continuous with this value in the brine system. Value indicated in Volts.	10V (range: 3V / 10V)
MIN FLOW CIRC.	Lowest permitted voltage (speed) of the circulation pump's flow in the heating system. If there is no heat demand, there may still be a demand to read in the temperatures for the sensors in the system and the circulation pump therefore must be run.	3V (range: 3V / 10V)
MAX H.W CHARGE HW	Highest supply temperature during water heating.	55°C (range: 45°C / 65°C)
MIN CHARGE. HW	Lowest desired supply temperature during water heating.	50°C (range: 30°C / 65°C)

14.8 Sub-menu HGW

The menu applies to DHP-H Opti Pro models with de-superheater and only appears if ON in SERVICE -> INSTALLATION -> SYSTEM -> ADDITION -> HGW menu is selected.

Table 35. Used to change the de-superheater's operating settings.

Menu selection	Meaning	Factory setting
HGW TEMP.	Shows the HGW sensor after the de-superheater (the supply temperature to water heater) in °C.	-
TEMP DIFF	Desired difference between the HGW sensor and water heater's start sensor.	20K (range: 15K / 35K)
HOT WATER DIFF.	Shows actual difference between the HGW sensor and water heater's start sensor.	-
HOT WATER TO RAD.	If there is a heat demand, the HGW shunt switches to the heating system when the weighted value is greater than the total of the START temperature for hot water and this value. Example: 40°+3K = at a temperature of 43°C in the water heater, the shunt switches to the heating system.	3K (range: 1K / 10K)
MAX TEMP.	Max temperature of the water in the water heater. The temperature is measured on the peak sensor in the water heater. Note! Domestic hot water can have this temperature, which can mean that an external mixer valve may be required.	95°C (range: 60°C / 100°C)
START HGW	The number of seconds the HGW shunt is to open at HGW start is the starting point of shunt opening. The opening time for the HGW shunt from fully closed to fully open towards the water heater is 30 seconds.	7S (range: 0S / 30S)
INITIALIZING HGW	The time in seconds before control of HGW shunt starts after HGW start.	60S (range: 10S / 90S)
INTEGRAL DELAY	Delay of integral calculation in seconds after the integral value for HGW has been reached.	10S (range: 5S / 120S)
HGW-SHUNT TIME	The time that the signal is active to open or close the HGW shunt completely.	35S (range: 15S / 60S)
HGW INT. BOUND.	Integral value (parameter) for HGW.	60 (range: 10 / 120)
HGW INTEGRAL	Shows the actual value for the HGW integral. Plus indicates that the shunt opens towards the hot water heater and minus indicates that the shunt opens towards the heating system.	-
PULSE WIDTH	How long the plus or minus signal to the shunt is to be high when the HGW integral has been reached.	0.25S (range: 0.20S / 1.00S)

15 Important parameters

15.1 Heat production - calculating

The indoor temperature is adjusted by changing the heat pump's heat curve, which is the control system's tool for calculating what the supply temperature should be for water that is sent out in the heating system. The heat curve calculates the supply temperature depending on the outdoor temperature. The lower the outdoor temperature, the higher the supply temperature. In other words, the supply temperature of the water fed to the heating system will increase linearly as the outdoor air temperature falls.

The heat curve will be adjusted in connection with installation. It must be adapted later on, however, to obtain a pleasant indoor temperature in any weather conditions. A correctly set heat curve reduces maintenance and saves energy.

15.2 CURVE

The control computer shows the value for CURVE by means of a graph in the display. The heat curve can be changed by adjusting the CURVE value. The CURVE value indicates the supply temperature of the water that is wanted to the heating system at an outdoor temperature of 0°C.

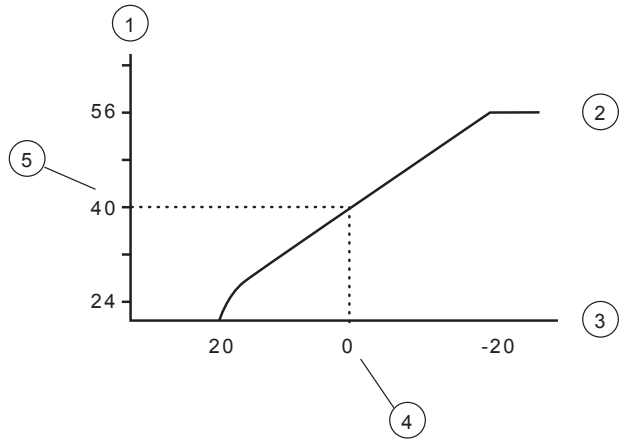


Figure 79. Graph showing the set value 40 for CURVE.

Position	Description
1	Temperature (°C)
2	Maximum setpoint value
3	Outdoor temperature (°C)

Position	Description
4	0
5	Set value (standard 40°C).

In the event of outdoor temperatures below 0°C, a higher setpoint value is calculated and in the event of outdoor temperatures greater than 0°C, a lower setpoint value is calculated.

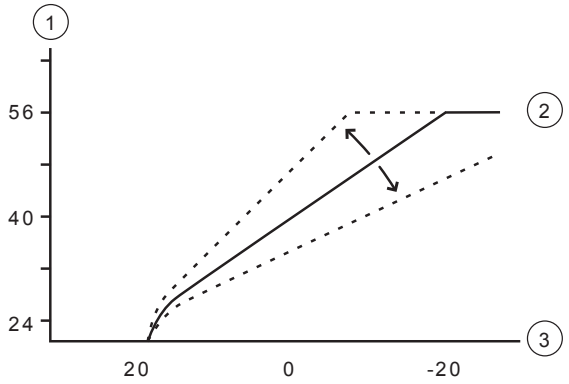


Figure 80. Increasing or reducing the CURVE changes the slope of the curve.

Position	Description
1	Temperature (°C)
2	Maximum setpoint value
3	Outdoor temperature (°C)

If the CURVE value is increased, the heat curve will become steeper and if the value is reduced, it will become flatter.

The most energy efficient and cost effective setting is achieved by changing the CURVE value which leads to fewer starts and longer operating times. For a temporary increase or reduction, adjust the ROOM value instead.

15.3 ROOM

If you wish to increase or reduce the indoor temperature, change the ROOM value. The difference between changing the ROOM value and the CURVE value is as follows:

- When changing the ROOM value, the angle of the curve on the system's heat curve does not change, instead the entire heat curve is moved by 3°C for every degree change of the ROOM value. The reason that the curve is adjusted 3°C is that an approximate 3°C increase in supply temperature is usually needed to increase the indoor temperature 1°C.

- When changing the CURVE value, the angle of the curve on the system's heat curve changes.

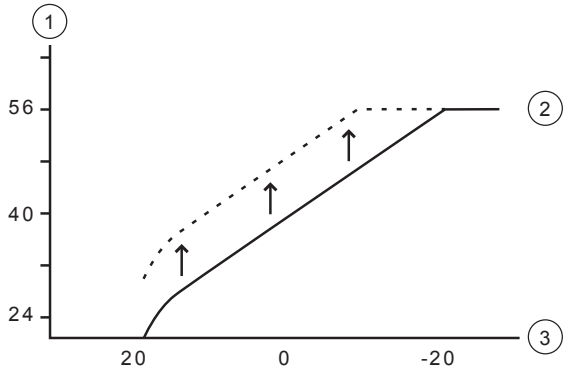


Figure 81. Changing the ROOM value changes the heat curve upwards or downwards.

Position	Description
1	Supply temperature (°C)
2	Maximum supply temperature
3	Outdoor temperature (°C)

The relationship of the supply temperature to the outdoor temperature will not be affected. The supply temperature will be increased or reduced by the same number of degrees all along the heat curve. I.E. The entire heat curve rises or drops instead of the curve gradient changing.

This method of adjusting the indoor temperatures can be used for a temporary raise or drop. For long term increases or reductions of the indoor temperature, the heat curve should be adjusted.

15.4 HEAT STOP

The HEAT STOP function automatically stops all production of radiator heat when the outdoor temperature is equal to, or higher than, the value entered for heat stop.

When the heat stop function is activated, the circulation pump will be turned off - except when hot water is being produced. The circulation pump will be "exercised" for one minute per day. The factory set value for activating heat stop is an outdoor temperature of 17°C. If the heat stop function is active, the outdoor temperature must drop 3°C when setting, before the heat stop is de-activated.

15.5 MIN and MAX

The MIN and MAX values are the lowest, respectively highest set point values that are allowed for the supply temperature.

Adjusting the minimum and maximum supply temperatures is particularly important if your home has under floor heating.

If your house has under floor heating and parquet floors, the supply line temperature must not exceed 45°C. Otherwise the floor might get damaged. If you have under floor heating and stone tiles, the MIN value should be 22-25°C, even in summer when no heating is required. This is to achieve a comfortable floor temperature.

If your house has a basement, the MIN value should be adjusted to a suitable temperature for the basement in summer. A condition for maintaining the heat in the basement in the summer is that all radiators have thermostat valves that switch off the heat in the rest of the house. It is extremely important that the heating system and the radiator valves are trimmed correctly. As it is usually the end customers themselves who have to carry out trimming, remember to inform them how to carry it out correctly. Also remember that the value for HEAT STOP needs adjusting upwards for summer heating.

15.6 TEMPERATURES

The heat pump can display a graph showing the history of the various sensors' temperatures and you can see how they have changed over 60 measurement points in time. The time interval between the measurement points can be adjusted between one minute and one hour, factory setting is one minute.

History is available for all sensors, but only the set value is shown in the display for the room sensor. The integral value that may appear is the heating system's energy balance.

15.7 INTEGRAL

The heat demand in the house depends on the season and weather conditions and is not constant. The heat demand can be expressed as temperature difference over time and can be calculated giving an integral value as a result (heat demand). To calculate the integral value, the control system uses several parameters.

A heat deficit is needed to start the heat pump, and there are two integral values, A1 (default value = -60), which starts the compressor and A2, (factory set = -600), which starts the auxiliary heater and A3, which starts the external auxiliary heater. During heat production, the deficit reduces and when the heat pump stops, the inertia in the system causes a surplus of heat.

The integral value is a measurement of the area under the time axis and is expressed in degree minutes. The figure below shows the factory settings for the integral values that the heat pump has. When the integral value has reached the set value for INTEGRAL A1 the compressor starts. If the integral value does not reduce but continues to increase the internal additional heat will start when the integral value reaches the set value for A2 and the external value at set value for A3

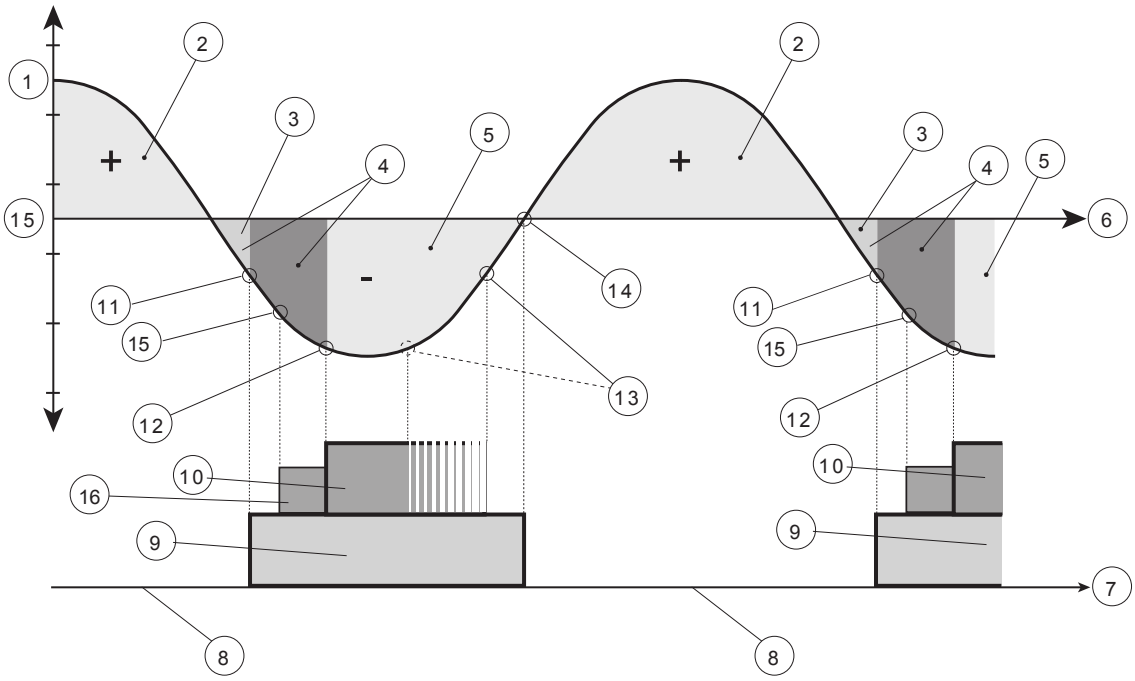


Figure 82. Starting and stopping heat pump operation based on integral values

Symbol explanation

1	Integral
2	Heat surplus
3	INTEGRAL A1
4	INTEGRAL A2
5	Heating deficit
6	Time
7	Heat pump operation
8	No operation
9	Compressor
10	Internal additional heater
11	Compressor start (A1)
12	Auxiliary heater start A2
13	Aux. heater stop (latest by A1)
14	Compressor stop (=0)

Symbol explanation

15 INTEGRAL A3

16 External auxiliary heater

The calculation of the integral value stops during heat stop. The calculation of the integral value stops when heat stop has stopped.

In this example INTEGRAL A3 < INTEGRAL A2. This means that the external addition will be activated earlier than the internal addition. On the condition that these are activated.

15.8 HYSTERESIS

In order to start the heat in advance during sudden changes of the heat demand, there is a value, HYSTERESIS, which controls the difference between the actual supply temperature, t_1 and the calculated supply temperature, t_2. If the difference is equal to or greater than the set HYSTERESIS value (x), i.e. there is a heat demand, or the heat demand disappears, quicker than the usual integral calculation, the integral value is forced to either the start value (-60) INTEGRAL A1 or to the stop value (0).

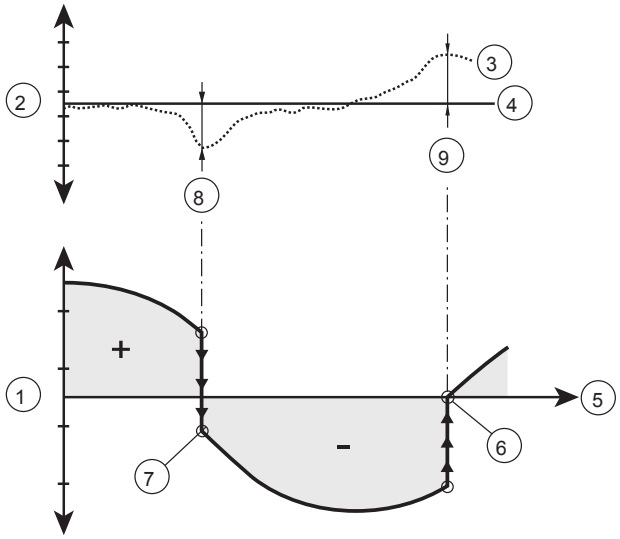


Figure 83. Conditions for HYSTERESIS to force the integral value to change.

Position	Description
1	Integral
2	Supply temperature
3	t_1
4	t_2
5	Time
6	Compressor stop (0)
7	Compressor start (-60)
8	Hysteresis (Δt) ≥ x
9	Hysteresis (Δt) ≥ x

15.9 DEFR CURVE

To start defrosting the outdoor unit for DHP A/DHP AL, the control computer makes a calculation using the temperature of the brine return and the outdoor temperature.

The calculation is based on a linear defrosting curve that can be set so that the heat pump and outdoor unit work optimally. The setting of three different values can be changed: DEFR CURVE 0, DEFR CURVE -20 and OUTDOOR STOP. The defrosting sequence starts when the temperature of the brine return reaches the set parameter value for the defrosting curve at an outdoor temperature somewhere along the defrosting curve.

The two parameters that are mainly changed are DEFR CURVE 0 and DEFR CURVE -20. The numbers behind the DEFR CURVE display what outdoor temperature the setting is for, that is to say at 0°C for DEFR CURVE 0 and -20°C for DEFR CURVE -20. The value -20 for DEFR CURVE -20 is the set value for OUTDOOR STOP, so if the value for OUTDOOR STOP changes, the numbers behind DEFR CURVE also change.

Factory setting for OUTDOOR STOP is -20°C. At this outdoor temperature, compressor operation is stopped and the additional heater takes over. Generally the value of OUTDOOR STOP does not need to be changed. Tests and operating cases have shown that -20°C operates very well as the stop temperature. In the text and figures below the value -20°C has been used for OUTDOOR STOP.

The display shows the value for DEFR CURVE 0 and DEFR CURVE -20 by means of a graph.

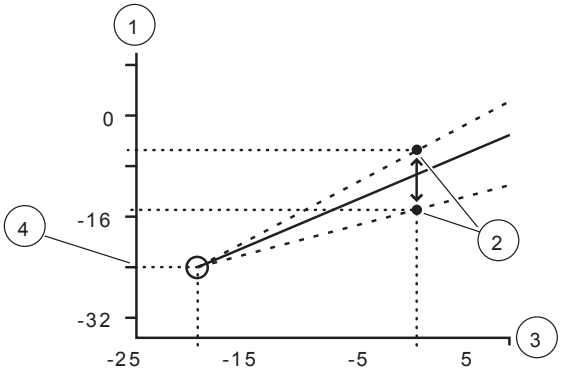


Figure 84. Graph that shows how the value for DEFR CURVE 0 can be set.

1. Temperature, input brine line
2. Adjustable interval for DEFR CURVE 0 is a brine return between -5°C and -15°C at 0°C outdoor temperature
3. Outdoor temperature
4. Set value for DEFR CURVE -20

The value for OUTDOOR STOP corresponds to the fact that the compressor will no longer be used for heating or hot water production if the outdoor temperature is the same as or lower than the value. Heating and hot water production will then be produced with the help of the auxiliary heater.

The value for DEFR CURVE 0 is the temperature that the brine return is permitted to reach when a defrost must start at outdoor temperature 0°C.

In the corresponding way the value for DEFR CURVE -20 is the temperature that the brine return has when a defrost should start at the set outdoor temperature for OUTDOOR STOP. The setting for DEFR CURVE –20 means that the value OUTDOOR STOP (-20°C) is reduced by between 1 and 8 degrees. This also determines how much lower the temperature for the brine return may be than -20°C in this case.

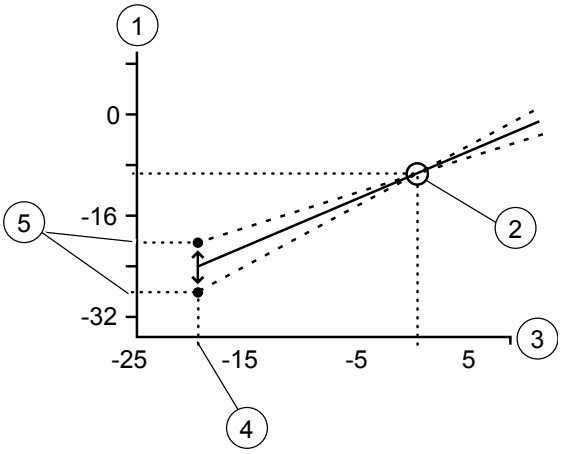


Figure 85. Graph that shows how the value for DEFR CURVE -20 can be set.

1. Temperature, input brine line
2. Set value for DEFR CURVE 0
3. Outdoor temperature
4. Set value for OUTDOOR STOP, -20°C

5. Adjustable value for DEFR CURVE -20 is 1°C to 8°C lower than OUTDOOR STOP

These three settings together create the defrosting curve and all three values have an effect on when defrosting will start, even if it is mainly DEFR CURVE 0 and DEFR CURVE -20 that is changed.

16 Start up

Note! Read the safety instructions!

Caution! The installation may only be commissioned if the heating system, water heater and brine system have been filled and bled. Otherwise the circulation pumps can be damaged.

Caution! Any alarms that may occur in connection with the installation must be fault-traced.

Caution! If the installation is only to provide heat by an auxiliary heater during the installation, ensure that the heating system is filled and bled and the compressor cannot be started. This is carried out by setting the operating mode to AUX. HEATER.

Caution! For heat pumps DHP-H Opti Pro SP (1-phase) it is imperative that the hot water temperature changes from default setting 95 °C to 85 °C.

16.1 Installation checklist

Before manual test operation, the following points must be checked to ensure that they have been correctly carried out:

- Piping installation
- Electrical Installation

16.1.1 Piping installation, heating system

- Pipe connections in accordance with the connection diagram
- Flexible hoses on the supply and return lines
- Surge tank on supply line
- Pipe insulation
- Strainer on return line
- Bleeding of the heating system
- All radiator valves fully open
- Expansion tank heating system (not included in the delivery)
- Safety valve for expansion tank (not included in the delivery)
- Filler cock heating system (not included in the delivery)
- Leakage inspection

If a an external water heater is installed, also check:

- Reversing valve
- Safety valve for cold water (9 bar)

16.1.2 Electrical Installation

- Circuit-breaker
- Fuse protection

- Direction of rotation of the compressor
- Coolant pump
- For DHP-A, DHP-AL, outdoor unit
- For DHP-A, DHP-AL, defrost sensor
- Positioning of the outdoor sensor
- Control computer settings

If a an external water heater is installed, also check:

- Reversing valve

16.1.3 Brine system

- Expansion/bleed tank on the return pipe
- Safety valve for expansion tank
- Filler cock on the return pipe
- Insulation in the outside wall lead-in
- Other brine pipe insulation
- Bleeding of brine system
- Leakage inspection

16.2 Manual test

Test operate and at the same time check the function of the components.

16.2.1 Activate MANUAL TEST

1. Ensure that the main circuit breaker is on.
2. Select operating mode ⏻, in the menu INFORMATION -> OPERAT.-> ⏻
3. Open the SERVICE menu by pressing and holding < in for five seconds.
4. Set the value for MANUAL TEST to 2.

Note! Set MANUAL TEST to 2 to navigate away from the menu during ongoing test operation.

16.2.2 Test the brine pump

1. Start the brine system's brine pump by setting the value BRINE PUMP to 1.
2. Check that the brine pump is running by:
   - listening
   - putting a hand on the pump
   - checking that the level in the expansion tank is stable. If the level is not stable there is air in the system.
   - listen for air
3. If the pump does not start automatically, perform manual start.
4. If there is air in the brine system, bleed the system.
5. Stop the brine pump by setting the value to 0.

16.2.3 Test the circulation pump

1. Start the heating system circulation pump by setting the value CIRC. PUMP to 1.
2. Check that the circulation pump is running by carrying out the following:
   - Listen
   - Place a hand on the pump

- Listen for air

3. If the pump does not start, see Starting circulation pumps manually
4. If there is air in the heating system, vent, see Bleeding the heating system
5. Stop the circulation pump by setting the value to 0.

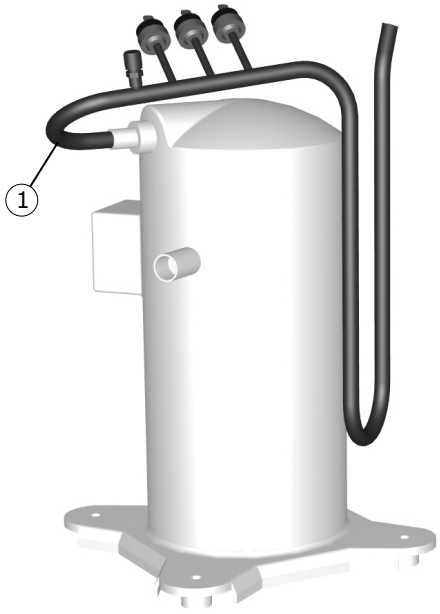
16.2.4 Test the exchange valve

1. Activate the 3-way valve by setting the value REV.V. HOT WATER to 1.
2. Check that the indicator on the exchange valve's upper side changes position.
3. If the indicator does not change position, perform fault tracing.

16.2.5 Test the compressor

1. Start the circulation pump by setting the value CIRC.PUMP to 1.
2. Start the heat pump compressor by setting the value HEAT PUMP to 1. At the same time as the value is set to 1 for HEAT PUMP the brine pump starts.

Warning! Risk of burn injury, the pressure pipe on the compressor can get up to 70-80 degrees in temperature after operating for a while!



Symbol explanation

1 Note! Hot!

Figure 86. The pressure pipe should get hot during operation

1. Check that:
   - the compressor is running in the right direction by putting a hand on the pressure pipe before the compressor starts, the pipe is then cold. Feel again after a short while to ensure the pressure pipe becomes properly hot.
   - it sounds normal and there is no noise.
2. If the pipe does not get hot, or if the compressor sounds abnormal, perform fault tracing according to the service instructions.
3. Stop the compressor by setting the value to 0.
4. Stop the brine pump by setting the value to 0.
5. Stop the circulation pump by setting the value to 0.

16.2.6 Testing the auxiliary heating power stages

1. Start the circulation pump by setting the value CIRC. PUMP to 1

AUX. HEAT 1

1. Start the first auxiliary heating power stage by setting the value ADD.HEAT 1 to 1.
2. Check that the auxiliary heater step works by exiting the MANUAL TEST menu and entering the INFORMATION -> TEMPERATURE -> SUPPLY LINE menu and check that the temperature rises.
3. Return to the menu MANUAL TEST and stop AUX. HEAT 1 by setting the value back to 0.

AUX. HEAT 2, AUX. HEAT 3

1. Repeat the steps in AUX. HEAT 1 for AUX. HEAT 2 and AUX. HEAT 3.
2. Stop the circulation pump by setting the value to 0.

16.2.7 Test fuse protection

1. Start the circulation pump by setting the value CIRC. PUMP to 1
2. Start the compressor by setting the value HEAT PUMP to 1.
3. At the same time, start the auxiliary heating power stages available to check that the fuse protection can withstand full power operation.
4. Stop the auxiliary heating power stages and the compressor by setting the value back to 0.
5. Stop the circulation pump by setting the value to 0.

16.2.8 Test the outdoor unit for DHP-A, -AL

1. Start the defroster shunt by setting the value SHUNT DEFR to 1.
2. Start the fan at low speed by setting the FAN L value to 1. Check that the fan runs at low speed.
3. Start the fan at high speed by setting the FAN H value to 1. Check that the fan runs at high speed.

16.2.9 Exit test operation

Set the value for MANUAL TEST to 0.

17 Commissioning

17.1 Starting circulation pumps manually

If any of the circulation pumps do not start, it may need to be helped as follows:

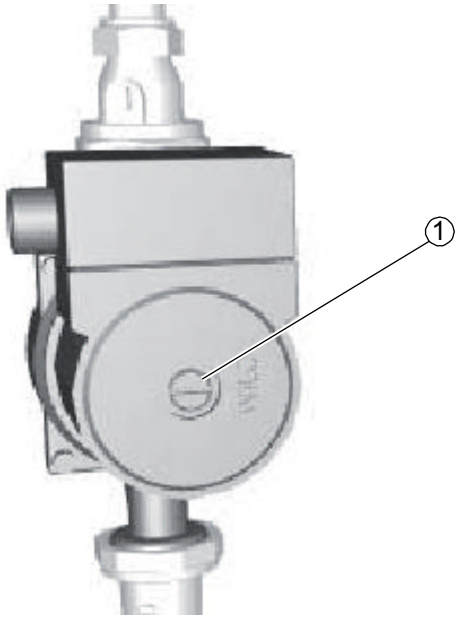


Figure 87. Location of the bleed screw

Caution! When bleeding the circulation pumps, water can come into contact with electrical components. Therefore, protect the electric panel against water penetration.

1. Open and remove the bleed screw on the front of the pump. Ensure to catch the water that runs out when the screw is removed.
2. Insert a flat blade screwdriver and turn it in the direction of rotation of the pump (clockwise).
3. Reinstall the bleed screw with its rubber seal.

17.2 Adaptation to the heating system

Adjust the heat pump settings to the applicable heating system, for instance an underfloor heating or radiator system. The delta temperature must be at least 8°C above the heat pump. The delta temperature should be 3–5°C for the brine system. If none of the delta temperatures are reached, the flow of the circulation pumps may need adjusting depending on the applicable heating system.

17.2.1 Noise check

During transportation and installation there is a certain risk that the heat pump can be damaged, components may move or get bent and this can cause noise. Because of this it is important to check the heat pump when it has been installed and is ready to be commissioned to ensure that everything is in order. The heat pump should be tested in both heating and hot water modes to ensure that there is no abnormal noise. While doing this, check that there is no abnormal noise in other parts of the house.

Noise is produced from the outdoor unit when the fan is in operation, check during that manual operation that there is no disturbance in your own home as well as to any neighbours. A noise kit is available for purchase for the outdoor unit for DHP-A 10 and 12 if it is necessary to reduce the noise.

17.2.2 Select operating mode

Set the heat pump to the desired operating mode in the menu INFORMATION -> OPERAT. If necessary, set certain parameters in the control system, such as ROOM and CURVE.

17.3 Installing the front cover

Caution! Take care not to damage the front cover or display cables!

1. Hook on the lower edge of the front cover.
2. Carefully press the front cover's upper edge towards the heat pump.
3. Turn the catch in the top panel 90 degrees clockwise.

17.4 After start up

Note! Remember that it takes time for the heat pump to heat a cold house. It is best to let the heat pump work at its own pace and NOT raise or alter any values in the control system to try to heat it up more rapidly.

Caution! If there is an alarm in conjunction with installation it usually means that there is air in the system.

18 Customer information

After installation and test operation, the customer must be informed about their new heat pump installation. Below is a checklist regarding the information that the installer must give the customer:

- The model of the heat pump that has been installed
- Run through the User manual and show what it contains
- Describe the various operating modes and what they mean
- Describe the most common alarms and corrective actions
- Demonstrate how to navigate the control system and which settings the customer can set themselves
- Demonstrate how to view history and operating times
- Show the pipe installation and go through the periodic maintenance actions that the customers must be aware of:
  - check the recommended pressure on the manometers
  - fill the heating system
  - exercise safety valves
  - clean strainers
- Explain how the customer can tune their existing heating system according to the instructions in the User manual
- The applicable warranties
- Where the customer is to turn for servicing
- Finally, fill in the references at the back of the Maintenance instructions.

19 Technical data, DHP-H

Table 36. Technical data

DHP-H			4	6	8	10	12	16
Type			Brine/water					
Refrigerant	Type		R407C					
	Amount	kg	0,75	1,20	1,30	1,45	1,55	2,00
	Test pressurisation	MPa	3,4					
	Design pressure	MPa	3,1					
Compressor	Type		Scroll					
	Oil		POE					
Electrical data 3-N, ~50 Hz	Mains power supply	V	400					
	Rated output, compressor	kW	2,7	2,0	2,3	3,6	4,4	5,6
	Rated output, circulation pumps	kW	0,2	0,2	0,2	0,4	0,5	0,5
	Auxiliary heater, 3 step	kW	3/6/9					
	Start current[3]	A	17	12	10	18	17	18
	Circuit-breaker	A	16[9]/10[4]/10[5]/16[6]	10[4]/16[5]/20[6]	16[4]/16[5]/20[6]	16[4]/16[5]/20[6]	16[4]/20[5]/25[6]	20[4]/20[5]/25[6]
Electrical data 1-N, ~50 Hz	Mains power supply	V	230	230	230	230	230	*
	Rated output, compressor	kW	2,7	3,3	4,2	5,4	5,7	*
	Rated output, circulation pumps	kW	0,2	0,2	0,2	0,4	0,5	*
	Auxiliary heater, 3 step	kW	1,5/3,0/4,5	1,5/3,0/4,5	1,5/3,0/4,5	1,5/3,0/4,5	1,5/3,0/4,5	*
	Start current[3]	A	17	11	21	26	28	*
	Circuit-breaker	A	20[4]/25[5]/32[6]	25[4]/32[5]/40[6]	25[4]/32[5]/40[6]	32[4]/40[5]/50[6]	32[4]/40[5]/50[6]	*
Performance[10]	Heat factor[1]	kW	3,52	5,33	7,51	9,40	11,0	16,4
	COP[1]		3,90	4.04	4,34	4,24	4,20	3,99
	Heat factor[2]	kW	3,42	5,38	7,40	9,24	10,6	15,6
	COP[2]		3,05	3,41	3,57	3,51	3,39	3,19
	Incoming power[1]	kW	0,9	1,3	1,7	2,2	2,6	4,1
Nominal flow[8]	Cooling circuit	l/s	0,20	0,36	0,49	0,62	0,71	1,02
	Heating circuit	l/s	0,09	0,14	0,19	0,24	0,28	0,39
External available pressure [7]	Cooling circuit	kPa	38	35	32	76	69	37
	Heating circuit	kPa	51	48	44	39	58	53
Max/Min temperature	Cooling circuit	°C	20/-10					
	Heating circuit	°C	55/20					
Pressure switches	Low pressure	MPa	0,08					
	Operation	MPa	2,65/2,85					
	High pressure	MPa	3,10					
Water volume	Water heater	l	180					
	Condenser	l	0,8	1,6	1,9	2,1	2,1	2,9
	Evaporator	l	0,7	0,7	1,2	1,6	1,6	2,2

DHP-H			4	6	8	10	12	16
	De-superheater	l	*	*	*	*	*	*
Antifreeze			Ethylene glycol/ Ethanol					
Number of units			1					
Dimensions L x W x H		mm	690x596x1845					
Weight empty		kg	225	229	229	229	238	242
Weight filled		kg	405	409	409	409	418	422
Sound effect level[11]		dB(A)	46	47	44	46	48	57

Measurements have been carried out on a limited number of circulation pumps, which can give variations in results. Tolerances in the measurement methods can also give variations.

1) At B0W35 according to EN14511 (including circulation pumps).

2) At B0W45 according to EN14511 (including circulation pumps).

3) According to IEC61000.

4) Heat pump with 3 kW auxiliary heater (1-N 1.5 kW).

5) Heat pump with 6 kW auxiliary heater (1-N 3 kW).

6) Heat pump with 9 kW auxiliary heater (1-N 4.5 kW).

7) The pressure that must not be exceeded outside the heat pump without falling below the nominal flow. For the cooling circuit, these valves require pipe dimension Ø 40 x 2.4.

8) Nominal flow: Heat circuit Δ10 K, cooling circuit Δ3 K.

9) Fuse phase L1 (size 4 has 1-phase compressor).

10) The values apply to new heat pumps with clean heat exchangers.

11) Sound effect level measured according to EN ISO 3741 at BOW45 (EN 12102).

*) Not available for this version

20 Technical data; DHP-H Opti Pro

Table 37. Technical data

DHP-H Opti Pro			6	8	10	12	16
Type			Brine/water				
Refrigerant	Type		R407C				
	Amount	kg	1,15	1,35	1,40	1,55	1,70
	Test pressurisation	MPa	3,4				
	Design pressure	MPa	3,1				
Compressor	Type		Scroll				
	Oil		POE				
Electrical data 3-N, ~50 Hz	Mains power supply	V	400				
	Rated output, compressor	kW	2,0	2,3	3,6	4,4	5,6
	Rated output, circulation pumps	kW	0,1	0,1	0,2	0,2	0,4
	Auxiliary heater, 3 step	kW	3/6/9				
	Start current[3]	A	12	10	18	17	18
	Circuit-breaker	A	10[4]/16[5]/20[6]	16[4]/16[5]/20[6]	16[4]/16[5]/20[6]	16[4]/20[5]/25[6]	20[4]/20[5]/25[6]
Electrical data 1-N, ~50 Hz	Mains power supply	V	230	230	230	230	*
	Rated output, compressor	kW	3,3	4,2	5,4	5,7	*
	Rated output, circulation pumps	kW	0,1	0,1	0,2	0,2	*
	Auxiliary heater, 3 step	kW	1,5/3,0/4,5	1,5/3,0/4,5	1,5/3,0/4,5	1,5/3,0/4,5	*
	Start current[3]	A	11	21	26	28	*
	Circuit-breaker	A	25[4]/32[5]/40[6]	25[4]/32[5]/40[6]	32[4]/40[5]/50[6]	32[4]/40[5]/50[6]	*
Performance[10]	Heat factor[1]	kW	5,33	7,51	9,40	11,0	16,4
	COP[1]		4.04	4,34	4,24	4,20	3,99
	Heat factor[2]	kW	5,38	7,40	9,24	10,6	15,6
	COP[2]		3,41	3,57	3,51	3,39	3,19
	Incoming power[1]	kW	1,3	1,7	2,2	2,6	4,1
Nominal flow[8]	Cooling circuit	l/s	0,36	0,48	0,62	0,71	1,02
	Heating circuit	l/s	0,14	0,19	0,24	0,28	0,39
External available pressure [7]	Cooling circuit	kPa	37	42	63	45	52
	Heating circuit	kPa	63	60	56	58	96
Max/Min temperature	Cooling circuit	°C	20/-10				
	Heating circuit	°C	55/20				
Pressure switches	Low pressure	MPa	0,08				
	Operation	MPa	2,65/2,85				
	High pressure	MPa	3,10				
Water volume	Water heater	l	180				
	Condenser	l	1,6	1,9	2,1	2,1	2,9
	Evaporator	l	0,7	1,2	1,6	1,6	2,2
	De-superheater	l	0,2				
Antifreeze			Ethylene glycol/ Ethanol				

DHP-H Opti Pro			6	8	10	12	16
Number of units			1				
Dimensions L x W x H		mm	690x596x1845				
Weight empty		kg	231	231	231	240	244
Weight filled		kg	411	411	411	420	424
Sound effect level[11]		dB(A)	45	42	45	49	50

Measurements have been carried out on a limited number of circulation pumps, which can give variations in results. Tolerances in the measurement methods can also give variations.

1) At B0W35 according to EN14511 (including circulation pumps).

2) At B0W45 according to EN14511 (including circulation pumps).

3) According to IEC61000.

4) Heat pump with 3 kW auxiliary heater (1-N 1.5 kW).

5) Heat pump with 6 kW auxiliary heater (1-N 3 kW).

6) Heat pump with 9 kW auxiliary heater (1-N 4.5 kW).

7) The pressure that must not be exceeded outside the heat pump without falling below the nominal flow. For the cooling circuit, these valves require pipe dimension Ø 40 x 2.4.

8) Nominal flow: Heat circuit Δ10 K, cooling circuit Δ3 K.

9) Fuse phase L1 (size 4 has 1-phase compressor).

10) The values apply to new heat pumps with clean heat exchangers.

11) Sound effect level measured according to EN ISO 3741 at BOW45 (EN 12102).

*) Not available for this version

21 Technical data, DHP-L

Table 38. Technical data

DHP-L			4	6	8	10	12	16
Type			Brine/water					
Refrigerant	Type		R407C					
	Amount	kg	0,75	1,20	1,30	1,45	1,55	2,00
	Test pressurisation	MPa	3,4					
	Design pressure	MPa	3,1					
Compressor	Type		Scroll					
	Oil		POE					
Electrical data 3-N, ~50 Hz	Mains power supply	V	400					
	Rated output, compressor	kW	2,7	2,0	2,3	3,6	4,4	5,6
	Rated output, circulation pumps	kW	0,2	0,2	0,2	0,4	0,5	0,5
	Auxiliary heater, 3 step	kW	3/6/9					
	Start current[3]	A	17	12	10	18	17	18
	Circuit-breaker	A	16[9]/10[4]/10[5]/16[6]	10[4]/16[5]/20[6]	16[4]/16[5]/20[6]	16[4]/16[5]/20[6]	16[4]/20[5]/25[6]	20[4]/20[5]/25[6]
Electrical data 1-N, ~50 Hz	Mains power supply	V	230	230	230	230	230	*
	Rated output, compressor	kW	2,7	3,3	4,2	5,4	5,7	*
	Rated output, circulation pumps	kW	0,2	0,2	0,2	0,4	0,5	*
	Auxiliary heater, 3 step	kW	1,5/3,0/4,5	1,5/3,0/4,5	1,5/3,0/4,5	1,5/3,0/4,5	1,5/3,0/4,5	*
	Start current[3]	A	17	11	21	26	28	*
	Circuit-breaker	A	20[4]/25[5]/32[6]	25[4]/32[5]/40[6]	25[4]/32[5]/40[6]	32[4]/40[5]/50[6]	32[4]/40[5]/50[6]	*
Performance[10]	Heat factor[1]	kW	3,52	5,33	7,51	9,40	11,0	16,4
	COP[1]		3,90	4,04	4,34	4,24	4,20	3,99
	Heat factor[2]	kW	3,42	5,38	7,40	9,24	10,6	15,6
	COP[2]		3,05	3,41	3,57	3,51	3,39	3,19
	Incoming power[1]	kW	0,9	1,3	1,7	2,2	2,6	4,1
Nominal flow[8]	Cooling circuit	l/s	0,20	0,36	0,49	0,62	0,71	1,02
	Heating circuit	l/s	0,09	0,14	0,19	0,24	0,28	0,39
External available pressure [7]	Cooling circuit	kPa	38	35	32	76	69	37
	Heating circuit	kPa	51	48	44	39	58	53
Max/Min temperature	Cooling circuit	°C	20/-10					
	Heating circuit	°C	55/20					
Pressure switches	Low pressure	MPa	0,08					
	Operation	MPa	2,65/2,85					
	High pressure	MPa	3,10					
Water volume	Water heater	l	*	*	*	*	*	*
	Condenser	l	0,8	1,6	1,9	2,1	2,1	2,9
	Evaporator	l	0,7	0,7	1,2	1,6	1,6	2,2

DHP-L			4	6	8	10	12	16
	De-superheater	l	*	*	*	*	*	*
Antifreeze			Ethylene glycol/ Ethanol					
Number of units			1					
Dimensions L x W x H		mm	690x596x1538					
Weight empty		kg	140	145	150	155	165	175
Weight filled		kg	145	151	157	162	172	184
Sound effect level[11]		dB(A)	46	44	44	47	48	50

Measurements have been carried out on a limited number of circulation pumps, which can give variations in results. Tolerances in the measurement methods can also give variations.

1) At B0W35 according to EN14511 (including circulation pumps).

2) At B0W45 according to EN14511 (including circulation pumps).

3) According to IEC61000.

4) Heat pump with 3 kW auxiliary heater (1-N 1.5 kW).

5) Heat pump with 6 kW auxiliary heater (1-N 3 kW).

6) Heat pump with 9 kW auxiliary heater (1-N 4.5 kW).

7) The pressure that must not be exceeded outside the heat pump without falling below the nominal flow. For the cooling circuit, these valves require pipe dimension Ø 40 x 2.4.

8) Nominal flow: Heat circuit Δ10 K, cooling circuit Δ3 K.

9) Fuse phase L1 (size 4 has 1-phase compressor).

10) The values apply to new heat pumps with clean heat exchangers.

11) Sound effect level measured according to EN ISO 3741 at BOW45 (EN 12102).

*) Not available for this version

22 Technical data, DHP-L Opti

Table 39. Technical data

DHP-L Opti			6	8	10	12	16
Type			Brine/water				
Refrigerant	Type		R407C				
	Amount	kg	1,20	1,35	1,45	1,55	2,00
	Test pressurisation	MPa	3,4				
	Design pressure	MPa	3,1				
Compressor	Type		Scroll				
	Oil		POE				
Electrical data 3-N, ~50 Hz	Mains power supply	V	400				
	Rated output, compressor	kW	2,0	2,3	3,6	4,4	5,6
	Rated output, circulation pumps	kW	0,1	0,1	0,2	0,2	0,4
	Auxiliary heater, 3 step	kW	3/6/9				
	Start current[3]	A	12	10	18	17	18
	Circuit-breaker	A	10[4]/16[5]/20[6]	16[4]/16[5]/20[6]	16[4]/16[5]/20[6]	16[4]/20[5]/25[6]	20[4]/20[5]/25[6]
Electrical data 1-N, ~50 Hz	Mains power supply	V	230	230	230	230	*
	Rated output, compressor	kW	3,3	4,2	5,4	5,7	*
	Rated output, circulation pumps	kW	0,1	0,1	0,2	0,2	*
	Auxiliary heater, 3 step	kW	1,5/3,0/4,5	1,5/3,0/4,5	1,5/3,0/4,5	1,5/3,0/4,5	*
	Start current[3]	A	11	21	26	28	*
	Circuit-breaker	A	25[4]/32[5]/40[6]	25[4]/32[5]/40[6]	32[4]/40[5]/50[6]	32[4]/40[5]/50[6]	*
Performance[10]	Heat factor[1]	kW	5,33	7,51	9,40	11,0	16,4
	COP[1]		4.04	4,34	4,24	4,20	3,99
	Heat factor[2]	kW	5,38	7,40	9,24	10,6	15,6
	COP[2]		3,41	3,57	3,51	3,39	3,19
	Incoming power[1]	kW	1,3	1,7	2,2	2,6	4,1
Nominal flow[8]	Cooling circuit	l/s	0,36	0,48	0,62	0,71	1,02
	Heating circuit	l/s	0,14	0,19	0,24	0,28	0,39
External available pressure [7]	Cooling circuit	kPa	37	42	63	45	52
	Heating circuit	kPa	63	60	56	58	96
Max/Min temperature	Cooling circuit	°C	20/-10				
	Heating circuit	°C	55/20				
Pressure switches	Low pressure	MPa	0,08				
	Operation	MPa	2,65/2,85				
	High pressure	MPa	3,10				
Water volume	Water heater	l	*	*	*	*	*
	Condenser	l	1,6	1,9	2,1	2,1	2,9
	Evaporator	l	0,7	1,2	1,6	1,6	2,2
	De-superheater	l	*	*	*	*	*
Antifreeze			Ethylene glycol/ Ethanol				

DHP-L Opti			6	8	10	12	16
Number of units			1				
Dimensions L x W x H		mm	690x596x1538				
Weight empty		kg	145	150	155	165	175
Weight filled		kg	151	157	162	172	184
Sound effect level[11]		dB(A)	44	44	47	48	50

Measurements have been carried out on a limited number of circulation pumps, which can give variations in results. Tolerances in the measurement methods can also give variations.

1) At B0W35 according to EN14511 (including circulation pumps).

2) At B0W45 according to EN14511 (including circulation pumps).

3) According to IEC61000.

4) Heat pump with 3 kW auxiliary heater (1-N 1.5 kW).

5) Heat pump with 6 kW auxiliary heater (1-N 3 kW).

6) Heat pump with 9 kW auxiliary heater (1-N 4.5 kW).

7) The pressure that must not be exceeded outside the heat pump without falling below the nominal flow. For the cooling circuit, these valves require pipe dimension Ø 40 x 2.4.

8) Nominal flow: Heat circuit Δ10 K, cooling circuit Δ3 K.

9) Fuse phase L1 (size 4 has 1-phase compressor).

10) The values apply to new heat pumps with clean heat exchangers.

11) Sound effect level measured according to EN ISO 3741 at BOW45 (EN 12102).

*) Not available for this version

23 Technical data, DHP-C

Table 40. Technical data

DHP-C			6	8	10	4H	5H	7H
Type			Brine/water					
Refrigerant	Type		R407C	R407C	R407C	R134a	R134a	R134a
	Amount	kg	1,20	1,30	1,45	0,90	1,00	1,10
	Test pressurisation	MPa	3,4	3,4	3,4	3,2	3,2	3,2
	Design pressure	MPa	3,1	3,1	3,1	2,45	2,45	2,45
Compressor	Type		Scroll					
	Oil		POE					
Electrical data 3-N, ~50 Hz	Mains power supply	V	400					
	Rated output, compressor	kW	2,0	2,3	3,6	2,0	2,3	3,6
	Rated output, circulation pumps	kW	0,2	0,2	0,4	0,2	0,2	0,3
	Auxiliary heater, 3 step	kW	3/6/9					
	Start current[3]	A	12	10	18	12	10	18
	Circuit-breaker	A	10[4]/16[5]/20[6]	16[4]/16[5]/20[6]	16[4]/16[5]/20[6]	10[4]/16[5]/20[6]	16[4]/16[5]/20[6]	16[4]/16[5]/20[6]
Electrical data 1-N, ~50 Hz	Mains power supply	V	*	*	*	*	*	*
	Rated output, compressor	kW	*	*	*	*	*	*
	Rated output, circulation pumps	kW	*	*	*	*	*	*
	Auxiliary heater, 3 step	kW	*	*	*	*	*	*
	Start current[3]	A	*	*	*	*	*	*
	Circuit-breaker	A	*	*	*	*	*	*
Performance[10]	Heat factor[1]	kW	5,33	7,51	9,40	-	-	-
	COP[1]		4,04	4,34	4,24	-	-	-
	Heat factor[2]	kW	5,38	7,40	9,24	3,20	4,50	5,50
	COP[2]		3,41	3,57	3,51	2,70	2,90	2,90
	Incoming power[1]	kW	1,3	1,7	2,2	-	-	-
Nominal flow[8]	Cooling circuit	l/s	0,36	0,49	0,62	0,20	0,28	0,37
	Heating circuit	l/s	0,14	0,19	0,24	0,08	0,12	0,14
External available pressure [7]	Cooling circuit	kPa	35	32	78	50	45	60
	Heating circuit	kPa	48	44	39	48	50	43
Max/Min temperature	Cooling circuit	°C	20/-10					
	Heating circuit	°C	55/20					
Pressure switches	Low pressure	MPa	0,08	0,08	0,08	0,03	0,03	0,03
	Operation	MPa	2,65/2,85	2,65/2,85	2,65/2,85	1,80	1,80	1,80
	High pressure	MPa	3,10	3,10	3,10	2,45	2,45	2,45
Water volume	Water heater	l	180					
	Condenser	l	1,6	1,9	2,1	1,6	1,9	2,1
	Evaporator	l	0,7	1,2	1,6	0,7	1,2	1,6

DHP-C			6	8	10	4H	5H	7H
	De-superheater	l	*	*	*	*	*	*
Antifreeze			Ethylene glycol/ Ethanol					
Number of units			1					
Dimensions L x W x H		mm	690x596x1845					
Weight empty		kg	210	215	225	210	215	225
Weight filled		kg	390	395	405	390	395	405
Sound effect level[11]		dB(A)	47	44	46	47	44	46

Measurements have been carried out on a limited number of circulation pumps, which can give variations in results. Tolerances in the measurement methods can also give variations.

1) At B0W35 according to EN14511 (including circulation pumps).

2) At B0W45 according to EN14511 (including circulation pumps).

3) According to IEC61000.

4) Heat pump with 3 kW auxiliary heater (1-N 1.5 kW).

5) Heat pump with 6 kW auxiliary heater (1-N 3 kW).

6) Heat pump with 9 kW auxiliary heater (1-N 4.5 kW).

7) The pressure that must not be exceeded outside the heat pump without falling below the nominal flow. For the cooling circuit, these valves require pipe dimension Ø 40 x 2.4.

8) Nominal flow: Heat circuit Δ10 K, cooling circuit Δ 3 K.

9) Fuse phase L1 (size 4 has 1-phase compressor).

10) The values apply to new heat pumps with clean heat exchangers.

11) Sound effect level measured according to EN ISO 3741 at BOW45 (EN 12102).

*) Not available for this version

24 Technical data, DHP-A

Table 41. Technical data

DHP-A			6	8	10	12
Type			Air/water			
Refrigerant	Type		R404A			
	Amount	kg	0,95	1,45	1,50	1,60
	Test pressurisation	MPa	3,4			
	Design pressure	MPa	3,1			
Compressor	Type		Scroll			
	Oil		POE			
Electrical data 3-N ~50Hz	Mains power supply	V	400			
	Rated output, compressor	kW	2,0	2,3	3,6	4,4
	Rated output, circ.pumps/fan	kW	0,4	0,6	0,6	0,6
	Auxiliary heater, 5 step	kW	3/6/9/12/15			
	Start current[16]	A	12	10	18	17
	Circuit-breaker	A	10[3]/16[4]/20[5]/20[6]/25[7]/25[14]/30[15]	16[3]/16[4]/20[5]/20[6]/25[7]/25[14]/30[15]	16[3]/16[4]/20[5]/20[6]/25[7]/40[14]/35[15]	16[3]/20[4]/25[5]/25[6]/25[7]/30[14]/35[15]
Electrical data 1-N ~50Hz	Mains power supply	V	230			
	Rated output, compressor	kW	3,3	4,2	5,4	5,7
	Rated output, circ.pumps/fan	kW	0,4	0,6	0,6	0,6
	Auxiliary heater, 3 step	kW	1,5/3,0/4,5			
	Start current[16]	A	11	21	26	28
	Circuit-breaker	A	25[3]/32[4]/40[5]	25[3]/32[4]/40[5]	32[3]/40[4]/50[5]	32[3]/40[4]/50[5]
Performance[10]	Heat factor[1]	kW	5,00	7,02	8,20	9,84
	COP[1]		2,85	3,10	2,85	3,00
	Heat factor[2]	kW	5,90	7,96	9,85	11,3
	COP[2]		3,26	3,45	3,29	3,35
	Incoming power[2]	kW	1,8	2,3	3,0	3,4
Nominal flow[8]	Cooling circuit	l/s	0,32	0,49	0,58	0,64
	Heating circuit	l/s	0,14	0,22	0,22	0,28
External available pressure [9]	Cooling circuit	kPa	46	83	69	95
	Heating circuit	kPa	45	43	40	51
Lowest outdoor temperature for compressor start		°C	-20			
Max/Min temperature	Cooling circuit	°C	20/-25			
	Heating circuit	°C	55/20			
Pressure switches	Low pressure	MPa	0,08			
	Operation	MPa	2,65/2,85			
	High pressure	MPa	3,10			

DHP-A			6	8	10	12
Water volume	Water heater	l	180			
	Condenser	l	1,3	2,2	2,7	2,7
	Evaporator	l	1,0	1,3	1,3	1,6
Antifreeze [13]			Ethylene glycol + water solution with freezing point -32±1°C			
Number of units			2			
Indoor unit	Dimensions L x W x H	mm	690x596x1845			
	Weight empty	kg	260	260	260	268
	Weight filled	kg	440	440	440	448
	Sound effect level[11]	dB(A)	42	48	46	48
Outdoor unit	Dimensions L x W x H	mm	630x1175x1245			
	Weight empty	kg	94			
	Weight filled	kg	99			
	Sound effect level. Low/high [12]	dB(A)	53/63	53/63	54/67	54/67
	Fan speed, low/high	rpm	450/600	450/600	500/800	500/800
	Air flow, low/high	m^3/h	2500/3200	2500/3200	2500/3900	2500/3900
Max pipe length (copper pipe Ø 28 mm between heat pump and out-door unit)		m	60 (30+30)			

Measurements have been carried out on a limited number of circulation pumps, which can give variations in results. Tolerances in the measurement methods can also give variations.

1) For A2W35 according to EN14511 (including circulation pumps and outdoor units).

2) For A7W35 according to EN14511 (including circulation pumps and outdoor units).

3) Heat pump with 3 kW auxiliary heater (1-N 1.5 kW).

4) Heat pump with 6 kW auxiliary heater (1-N 3.0 kW).

5) Heat pump with 9 kW auxiliary heater (1-N 4.5 kW).

6) 12 kW aux. heater (compressor off).

7) 15 kW aux. heater (compressor off).

8) Nominal flow: Heat transfer fluid Δ10K, cooling circuit Δ3K.

9) The pressure that must not be exceeded outside the heat pump without falling below the nominal flow.

10) The values apply to new heat pumps with clean heat exchangers.

11) Sound effect level measured according to EN ISO 3741 at A7W45 (EN 12102).

12) Sound effect level measured according to EN ISO 3471.

13) Do not use propylene glycol or ethanol.

14) Heat pump with 12 kW additional heater.

15) Heat pump with 15 kW additional heater.

16) According to IEC61000.

25 Technical data, DHP-A Opti

Table 42. Technical data

DHP-A Opti			6	8	10	12
Type			Air/water			
Refrigerant	Type		R404A			
	Amount	kg	0,95	1,45	1,50	1,60
	Test pressurisation	MPa	3,4			
	Design pressure	MPa	3,1			
Compressor	Type		Scroll			
	Oil		POE			
Electrical data 3-N ~50Hz	Mains power supply	V	400			
	Rated output, compressor	kW	2,0	2,3	3,6	4,4
	Rated output, circ.pumps/fan	kW	0,3	0,3	0,4	0,6
	Auxiliary heater, 5 step	kW	3/6/9/12/15			
	Start current[16]	A	12	10	18	17
	Circuit-breaker	A	10[3]/16[4]/20[5]/20[6] / 25[7]/25[14]/30[15]	16[3]/16[4]/20[5]/20[6] / 25[7]/25[14]/30[15]	16[3]/16[4]/20[5]/20[6] / 25[7]/30[14]/35[15]	16[3]/20[4]/25[5]/25[6]/ 25[7]/30[14]/35[15]
Electrical data 1-N ~50Hz	Mains power supply	V	230			
	Rated output, compressor	kW	3,3	4,2	5,4	5,7
	Rated output, circ.pumps/fan	kW	0,3	0,3	0,4	0,6
	Auxiliary heater, 3 step	kW	1,5/3,0/4,5			
	Start current[16]	A	11	21	26	28
	Circuit-breaker	A	25[3]/32[4]/40[5]	25[3]/32[4]/40[5]	32[3]/40[4]/50[5]	32[3]/40[4]/50[5]
Performance[10]	Heat factor[1]	kW	5,00	7,02	8,20	9,84
	COP[1]		2,85	3,10	2,85	3,00
	Heat output[2]	kW	5,90	7,96	9,85	11,3
	COP[2]		3,26	3,45	3,29	3,35
	Incoming power[2]	kW	1,8	2,3	3,0	3,4
Nominal flow[8]	Cooling circuit	l/s	0,32	0,49	0,58	0,64
	Heating circuit	l/s	0,14	0,20	0,24	0,28
External available pressure [9]	Cooling circuit	kPa	88	74	56	98
	Heating circuit	kPa	61	59	57	51
Lowest outdoor temperature for compressor start		°C	-20			
Max/Min temperature	Cooling circuit	°C	20/-25			
	Heating circuit	°C	55/20			
Pressure switches	Low pressure	MPa	0,08			
	Operation	MPa	2,65/2,85			
	High pressure	MPa	3,10			

DHP-A Opti			6	8	10	12
Water volume	Water heater	l	180			
	Condenser	l	1,3	2,2	2,7	2,7
	Evaporator	l	1,0	1,3	1,3	1,6
Antifreeze [13]			Ethylene glycol + water solution with freezing point -32±1°C			
Number of units			2			
Indoor unit	Dimensions L x W x H	mm	690x596x1845			
	Weight empty	kg	260	260	260	268
	Weight filled	kg	440	440	440	448
	Sound effect level[11]	dB(A)	42	48	46	48
Outdoor unit	Dimensions L x W x H	mm	630x1175x1245			
	Weight empty	kg	94			
	Weight filled	kg	99			
	Sound effect level, low/high [12]	dB(A)	53/63	53/63	54/67	54/67
	Fan speed, low/high	rpm	450/600	450/600	500/800	500/800
	Air flow, low/high	m^3/h	2500/3200	2500/3200	2500/3900	2500/3900
Max pipe length (copper pipe Ø28mm between heat pump and outdoor unit)		m	60 (30+30)			

Measurements have been carried out on a limited number of circulation pumps, which can give variations in results. Tolerances in the measurement methods can also give variations.

1) For A2W35 according to EN14511 (including circulation pumps and outdoor units).

2) For A7W35 according to EN14511 (including circulation pumps and outdoor units).

3) Heat pump with 3 kW auxiliary heater (1-N 1.5 kW).

4) Heat pump with 6 kW auxiliary heater (1-N 3.0 kW).

5) Heat pump with 9 kW auxiliary heater (1-N 4.5 kW).

6) 12 kW aux. heater (compressor off).

7) 15 kW aux. heater (compressor off).

8) Nominal flow: Heat transfer fluid Δ10K, cooling circuit Δ3K.

9) The pressure that must not be exceeded outside the heat pump without falling below the nominal flow.

10) The values apply to new heat pumps with clean heat exchangers.

11) Sound effect level measured according to EN ISO 3741 at A7W45 (EN 12102).

12) Sound effect level measured according to EN ISO 3741.

13) Do not use propylene glycol or ethanol.

14) Heat pump with 12 kW additional heater.

15) Heat pump with 15 kW additional heater.

16) According to IEC61000.

26 Technical data, DHP-AL

Table 43. Technical data

DHP-AL			6	8	10	12
Type			Air/water			
Refrigerant	Type		R404A			
	Amount	kg	0,95	1,45	1,50	1,60
	Test pressurisation	MPa	3,4			
	Design pressure	MPa	3,1			
Compressor	Type		Scroll			
	Oil		POE			
Electrical data 3-N ~50Hz	Mains power supply	V	400			
	Rated output, compressor	kW	2,0	2,3	3,6	4,4
	Rated output, circ.pumps/fan	kW	0,4	0,6	0,6	0,6
	Auxiliary heater, 5 step	kW	3/6/9/12/15			
	Start current[16]	A	12	10	18	17
	Circuit-breaker	A	$10^{3}/16^{4}/20^{5}/20^{6}$ / $25^{7}/25^{14}/30^{15}$	$16^{3}/16^{4}/20^{5}/20^{6}$ / $25^{7}/25^{14}/30^{15}$	$16^{3}/16^{4}/20^{5}/20^{6}$ / $25^{7}/30^{14}/35^{15}$	$16^{3}/20^{4}/25^{5}/25^{6}$/ $25^{7}/30^{14}/35^{15}$
Electrical data 1-N ~50Hz	Mains power supply	V	230			
	Rated output, compressor	kW	3,3	4,2	5,4	5,7
	Rated output, circ.pumps/fan	kW	0,4	0,6	0,6	0,6
	Auxiliary heater, 3 step	kW	1,5/3,0/4,5			
	Start current[16]	A	11	21	26	28
	Circuit-breaker	A	$25^{3}/32^{4}/40^{5}$	$25^{3}/32^{4}/40^{5}$	$32^{3}/40^{4}/50^{5}$	$32^{3}/40^{4}/50^{5}$
Performance[10]	Heat factor[1]	kW	5,00	7,02	8,20	9,84
	COP[1]		2,85	3,10	2,85	3,00
	Heat factor[2]	kW	5,90	7,96	9,85	11,3
	COP[2]		3,26	3,45	3,29	3,35
	Incoming power[2]	kW	1,8	2,3	3,0	3,4
Nominal flow[8]	Cooling circuit	l/s	0,32	0,49	0,58	0,64
	Heating circuit	l/s	0,14	0,22	0,22	0,28
External available pressure [9]	Cooling circuit	kPa	46	83	69	95
	Heating circuit	kPa	45	43	40	51
Lowest outdoor temperature for compressor start		°C	-20			
Max/Min temperature	Cooling circuit	°C	20/-25			
	Heating circuit	°C	55/20			
Pressure switches	Low pressure	MPa	0,08			
	Operation	MPa	2,65/2,85			
	High pressure	Mpa	3,10			

DHP-AL			6	8	10	12
Water volume	Water heater	l	180			
	Condenser	l	1,3	2,2	2,7	2,7
	Evaporator	l	1,0	1,3	1,3	1,6
Antifreeze [13]			Ethylene glycol + water solution with freezing point -32±1°C			
Number of units			3			
Indoor unit	Dimensions L x W x H	mm	690x596x1538			
	Weight empty	kg	154	154	154	162
	Weight filled	kg	158	159	160	168
	Sound effect level[11]	dB(A)	42	48	46	48
Water heater	Dimensions L x W x H	mm	690x596x1538			
	Weight empty	kg	172			
	Weight filled	kg	352			
Outdoor unit	Dimensions L x W x H	mm	630x1175x1245			
	Weight empty	kg	94			
	Weight filled	kg	99			
	Sound effect level, low/high [12]	dB(A)	53/63	53/63	54/67	54/67
	Fan speed, high/low	rpm	450/600	450/600	500/800	500/800
	Air flow, low/high	m^3/h	2500/3200	2500/3200	2500/3900	2500/3900
Max pipe length (copper pipe Ø28mm between heat pump and outdoor unit)		m	60 (30+30)			

Measurements have been carried out on a limited number of circulation pumps, which can give variations in results. Tolerances in the measurement methods can also give variations.

1) For A2W35 according to EN14511 (including circulation pumps and outdoor units).

2) For A7W35 according to EN14511 (including circulation pumps and outdoor units).

3) Heat pump with 3 kW auxiliary heater (1-N 1.5 kW).

4) Heat pump with 6 kW auxiliary heater (1-N 3.0 kW).

5) Heat pump with 9 kW auxiliary heater (1-N 4.5 kW).

6) 12 kW aux. heater (compressor off).

7) 15 kW aux. heater (compressor off).

8) Nominal flow: Heat transfer fluid Δ10K, cooling circuit Δ3K.

9) The pressure that must not be exceeded outside the heat pump without falling below the nominal flow.

10) The values apply to new heat pumps with clean heat exchangers

11) Sound effect level measured according to EN ISO 3741 at A7W45 (EN 12102).

12) Sound effect level measured according to EN ISO 3741.

13) Do not use propylene glycol or ethanol.

14) Heat pump with 12 kW additional heater.

15) Heat pump with 15 kW additional heater.

16) According to IEC6100

27 Technical data, DHP-AL Opti

Table 44. Technical data

DHP-AL Opti			**6**	**8**	**10**	**12**
Type			Air/water			
Refrigerant	Type		R404A			
	Amount	kg	0,95	1,45	1,50	1,60
	Test pressurisation	MPa	3,4			
	Design pressure	MPa	3,1			
Compressor	Type		Scroll			
	Oil		POE			
Electrical data 3-N ~50Hz	Mains power supply	V	400			
	Rated output, compressor	kW	2,0	2,3	3,6	4,4
	Rated output, circ.pumps/fan	kW	0,3	0,3	0,4	0,6
	Auxiliary heater, 5 step	kW	3/6/9/12/15			
	Start current[16]	A	12	10	18	17
	Circuit-breaker	A	10[3]/16[4]/20[5]/20[6]/25[7]/25[14]/30[15]	16[3]/16[4]/20[5]/20[6]/25[7]/25[14]/30[15]	16[3]/16[4]/20[5]/20[6]/25[7]/30[14]/35[15]	16[3]/20[4]/25[5]/25[6]/25[7]/30[14]/35[15]
Electrical data 1-N ~50Hz	Mains power supply	V	230			
	Rated output, compressor	kW	3,3	4,2	5,4	5,7
	Rated output, circ.pumps/fan	kW	0,3	0,3	0,4	0,6
	Auxiliary heater, 3 step	kW	1,5/3,0/4,5			
	Start current[16]	A	11	21	26	28
	Circuit-breaker	A	25[3]/32[4]/40[5]	25[3]/32[4]/40[5]	32[3]/40[4]/50[5]	32[3]/40[4]/50[5]
Performance[10]	Heat output[1]	kW	5,00	7,02	8,20	9,84
	COP[1]		2,85	3,10	2,85	3,00
	Heat output[2]	kW	5,90	7,96	9,85	11,3
	COP[2]		3,26	3,45	3,29	3,35
	Incoming power[2]	kW	1,8	2,3	3,0	3,4
Nominal flow[8]	Cooling circuit	l/s	0,32	0,49	0,58	0,64
	Heating circuit	l/s	0,14	0,20	0,24	0,28
External available pressure [9]	Cooling circuit	kPa	88	74	56	98
	Heating circuit	kPa	61	59	57	51
Lowest outdoor temperature for compressor start		°C	-20			
Max/Min temperature	Cooling circuit	°C	20/-25			
	Heating circuit	°C	55/20			
Pressure switches	Low pressure	MPa	0,08			
	Operation	MPa	2,65/2,85			
	High pressure	MPa	3,10			
Water volume	Water heater	l	180			

DHP-AL Opti			6	8	10	12
	Condenser	l	1,3	2,2	2,7	2,7
	Evaporator	l	1,0	1,3	1,3	1,6
Antifreeze [13]			Ethylene glycol + water solution with freezing point below -32?			
Number of units			3			
Indoor unit	Dimensions L x W x H	mm	690x596x1538			
	Weight empty	kg	154	154	154	162
	Weight filled	kg	158	159	160	168
	Sound effect level[11]	dB(A)	42,5	47,7	45,5	48,1
Water heater	Dimensions L x W x H	mm	690x596x1538			
	Weight empty	kg	172			
	Weight filled	kg	352			
Outdoor unit	Dimensions L x W x H	mm	630x1175x1245			
	Weight empty	kg	94			
	Weight filled	kg	99			
	Sound effect level, high/low[12]	dB(A)	53/63	53/63	54/67	54/67
	Fan speed, high/low	rpm	450/600	450/600	500/800	500/800
	Air flow, low/high	m^3/h	2500/3200	2500/3200	2500/3900	2500/3900
Max pipe length (copper pipe Ø28mm between heat pump and outdoor unit)		m	60 (30+30)			

Measurements have been carried out on a limited number of circulation pumps, which can give variations in results. Tolerances in the measurement methods can also give variations.

1) For A2W35 according to EN14511 (including circulation pumps and outdoor units).

2) For A7W35 according to EN14511 (including circulation pumps and outdoor units).

3) Heat pump with 3 kW auxiliary heater (1-N 1.5 kW).

4) Heat pump with 6 kW auxiliary heater (1-N 3.0 kW).

5) Heat pump with 9 kW auxiliary heater (1-N 4.5 kW).

6) 12 kW aux. heater (compressor off).

7) 15 kW aux. heater (compressor off).

8) Nominal flow: Heat circuit Δ10K, cooling circuit Δ3K.

9) The pressure that must not be exceeded outside the heat pump without falling below the nominal flow.

10) The values apply to new heat pumps with clean heat exchangers.

11) Sound effect level measured according to EN ISO 3741 at A7W45 (EN 12102).

12) Sound effect level measured according to EN ISO 3471.

13) Do not use propylene glycol or ethanol.

14) Heat pump with 12 kW additional heater.

15) Heat pump with 15 kW additional heater.

16) According to IEC6100.